



**THIS MANUAL MUST BE LEFT WITH THE  
HOMEOWNER FOR FUTURE REFERENCE**

### Shipping and Packing List

#### Items Shipped

- Model HCSteam-16—(catalog number Y3478) Duct steam injection, 16 gallons per day (5.5 pounds per hour) 110 VAC, -15%/+10% (94-121 VAC).
- Model HCSteam-35—(catalog number Y3479) Duct steam injection, 35 gallons per day (12 pounds per hour) 230 VAC, -15%/+10% (196-253 VAC)

Humidifier installation parts — 10 foot steam hose, steam hose adapter, steam nozzle, water fill hose, condensate hose, mounting template, installation instructions, product warranty, steam hose clamps (2), condensate hose clamp.

Air proving switch kit (Cat. no. Y3786)—includes 6' tubing, switch installation sheet, two ductwork pressure tube taps, mounting screws and anchors.

#### Other Required Items

- 1/2" water line
- 25 Amp dedicated electrical circuit
- 1-1/4" extension tube (can be plumbed into a open drain or water drain receiver or a high-capacity condensate pump, that can hold 1 gallon of 140°F water then plumbed into a 3/4" drain line) and pump at least 7.1 gallons per minute or 426 gallons per hour with installed lift). Hartell A5 series condensate pumps are capable of meeting the pumping requirements up to 24 foot lift.

# INSTALLATION INSTRUCTIONS

## HCSteam-16/-35 Residential Healthy Climate® Steam Humidifier

INDOOR AIR QUALITY

506746-01

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Supersedes 5/2012

**TP** Technical  
Publications

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#### Before beginning installation

Check for shipping damage to cartons. Mark the shipping waybill accordingly.

Open cartons and check equipment for shipping damage or missing components; if found, immediately report any discrepancies to the last carrier.

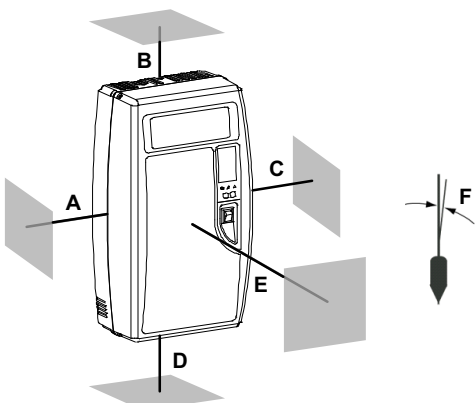
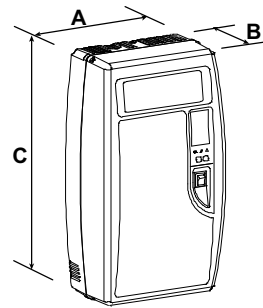
### **!** NOTICE

The humidifier must be installed in accordance with all local and national standards.

Installation, adjustments, alterations, service and maintenance must be performed by a qualified service technician.



**Table 1. Clearances, Unit Dimensions, and Component/Feature Specifications**

Clearances		Unit Dimensions	
 <p>in. (mm)</p> <p>A 6 (150)</p> <p>B 6 (150)</p> <p>C 6 (150)</p> <p>D 6 (150)</p> <p>E 24 (600)</p> <p>F max. 0.2° angle</p>		 <p>in. (mm)</p> <p>A 13-1/2 (343)</p> <p>B 8-1/8 (206)</p> <p>C 23-3/4 (603)</p> <p>Lbs. (kg)</p> <p>16 (8)</p> <p>22 (10)</p> <p>26 (12)</p>	
Component/Feature	Nominal Specifications/Range	Tolerance	
Steam capacity (HCSteam-35)	12 lb/h (5.4 kg/h)	-15%	+10%
Steam capacity (HCSteam-16)	5-1/2 lb/h (2.5 kg/h)	-15%	+10%
Water supply pressure limits	15 psi to 116 psi (0.1 to 0.8 MPa)	--	--
Water supply temperature limits	34°F to 104°F (1°C to 40°C)	--	--
Water supply flow minimum	0.12 gpm (0.45 L/min)	--	--
Power supply (HCSteam-35)	230 VAC	-15%	+10%
Power supply (HCSteam-16)	110 VAC	-15%	+10%
Total Drain Water Flow	7 gpm (26.2 L/min)	-10%	+10%
Ambient temperature operating	34°F to 104°F (1°C to 40°C)	--	--
Ambient humidity operating	10 to 60% rH	--	--

## General

### ⚠ WARNING

Before installing or handling the humidifier, please carefully read and follow the instructions and safety standards described in this manual and on the labels attached to the HCSteam-16/-35 Residential Steam Humidifier.

### ⚠ NOTICE

Water supply to humidifier cannot be from a hot water supply.

Using a hot water supply can damage some humidifier components and will void warranty.

The HCSteam-16/-35 humidifier produces non-pressurized steam which is then used to humidify the air.

The quality of the water used affects the operation of this unit, so the humidifier may be supplied with untreated water, as long as it is drinkable and not heated, softened or de-mineralized. The water converted into steam is automatically replaced through an electric fill valve. Periodically, based on the water quality, the unit will also drain some water to dilute the build-up of minerals in the steam generator.

This humidifier has been designed to directly humidify ducts using a distribution system. The installation, use and maintenance operations must be carried out according to the instructions contained in this manual and on the labels applied internally and externally.

Disconnect the humidifier from the main power supply before accessing any internal parts.

The conditions of the environment and the power supply voltage must comply with the specified values listed on the data label in the humidifier.

All other uses and modifications made to the humidifier that are not authorized by Lennox are considered unauthorized, and Lennox assumes no liability for the consequences of any such unauthorized use.

Please note that the humidifier contains powered electrical devices and hot surfaces.

### ⚠ NOTICE

The humidifier requires water to operate.

Do NOT mount it above materials or machinery that could be damaged if a leak occurs. Lennox assumes no responsibility for consequential or inconsequential damage as a result of any leaks.

If unit must be located where any leaking water could cause damage, an auxiliary drain pan is recommended.

### Disposal of Humidifier Parts

The humidifier is made up of metallic and plastic parts. All parts must be disposed of according to the local standards on waste disposal.

## Basic Humidifier Operation

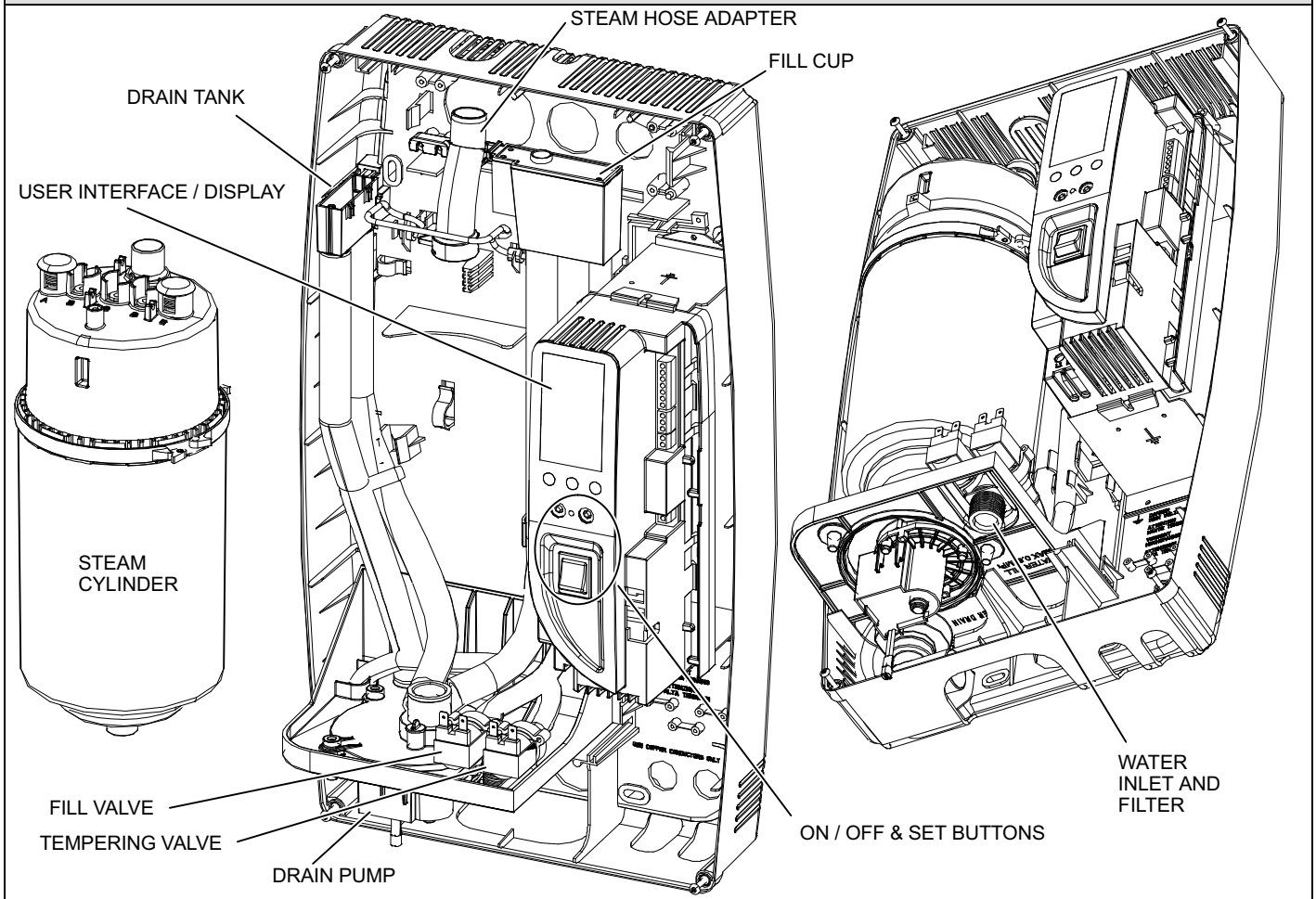


Figure 1. Basic Humidifier Components

### **CAUTION**

#### SCALDING HAZARD!

The humidifier has heated parts (100°C/ 212°F).

The HCSteam-16/-35 is an electrode humidifier. It produces steam for humidification by passing electric current through metal electrodes (7, figure 2) immersed in water inside a plastic steam cylinder (5). There are no heating elements. Steam output is directly proportional to the conductivity of the water, and the amount of electrode immersed in the water.

On a call for humidity, the HCSteam-16/-35 humidifier controller opens the water fill valve (1) and allows water to enter the cylinder. A flow restrictor (4) prevents the unit from filling too quickly or with too much pressure. The water flows up the fill tube (2) and into the fill cup (3). Water then flows over the dam in the fill cup (3), creating a 1" air gap that prevents contaminated water backflow into feed lines. Water then flows through the fill tube (6) and into the bottom of the steam cylinder (5). Any backflow or overflow of water travels through the overflow hose (13) to the drain.

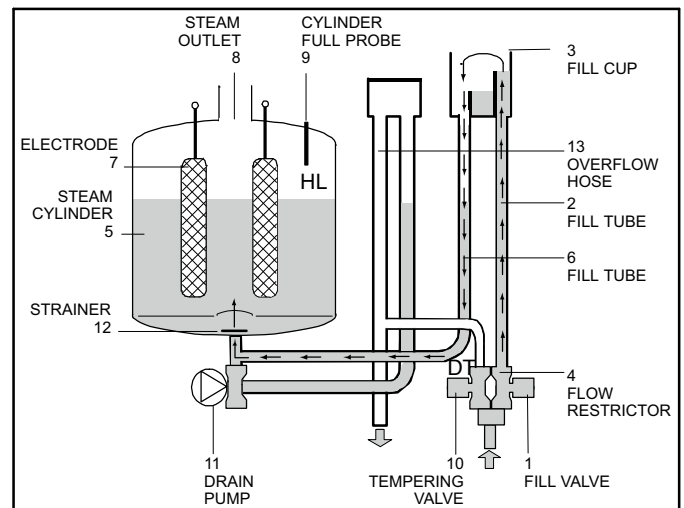


Figure 2. Basic Humidifier Operation

As the water fills the cylinder, it will reach the electrodes (7) and current will begin to flow. As the water continues to fill the cylinder, the current will increase, and this is monitored by an amperage transformer connected to one of the power wires and located on the electronic controller. When

the desired current is reached, the fill valve (1) will close and the water will then begin to warm and produce steam. If the water reaches the cylinder full probe (9) or if current rises too much, the drain pump (11) will be activated to drain away some water and reduce the current flow to acceptable levels. Note that, any time the drain pump is activated, the tempering valve (10) will be opened for tempering the hot drained water down to 140° F (60°C) in accordance to local and national standards.

Periodically, based on the incoming water conductivity, the unit will run the drain pump (11) and drain some water to reduce the mineral concentration. A strainer (12) in the cylinder helps to prevent mineral debris from jamming the drain pump (11).

In case the HCSteam-16/-35 humidifier remains powered but idle, i.e. without producing steam, for more than 48 hours (2 days), the cylinder will be emptied to not have stagnant water inside.

If there is no water in the cylinder, there will be no current flow and no steam production. The electrodes do not burn out, but they will eventually become completely coated with mineral and the cylinder will then need to be replaced. Cleaning cylinders may cause electrode damage, therefore voiding its warranty. See maintenance section on Page 21.

## Installation

### Installing the Nozzle

The HCSteam-16/-35 humidifier's nozzle must be installed onto the ductwork near the humidifier. Refer to the Steam Distribution section (Page 8) for information on how to properly locate the nozzle, for dimensions for the hole mounting pattern, and for connections to the humidifier and to the condensate drain. (Also see figure 6 for a typical installation diagram.)

Drill a 2-1/4" (57 mm) hole in the ductwork at the selected location for inserting the nozzle into the duct work. Position the nozzle in the hole. Mark and drill 1/16" mounting holes and use self-tapping sheet metal screws to attach the nozzle to the duct.

### Removing the Humidifier Front Cover

The front cover is secured by four screws located at the four corners of the unit. Using a Phillips head screwdriver, loosen the four cover screws and then pull the front cover away from the back part of the unit (see figure 3).

### Installing the Humidifier

## ⚠ CAUTION

Do not install the humidifier in an location that is within the reach of children.

If unit must be located where any leaking water could cause damage, an auxiliary drain pan is recommended.

Do not install the humidifier in an unconditioned space or where ambient temperature would be outside humidifier's specified operating temperature (attic or crawl space).

### Positioning the Humidifier

The HCSteam-16/-35 humidifier has been designed for on-wall installation. The simplest and most efficient installation would have the humidifier installed just below the duct where the steam nozzle is to be installed. This minimizes steam hose length and the amount of condensate. **Certain clearances must be maintained around the unit for safety and maintenance (see table 1 on Page 2).**

If present, remove packing as shown in figure 4.

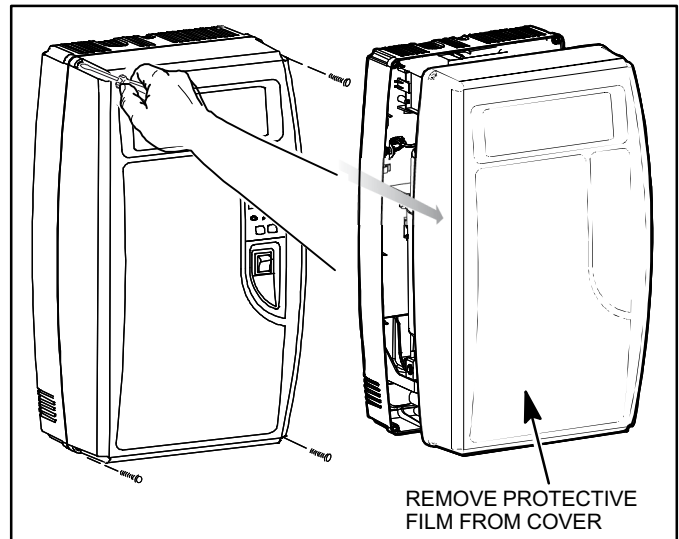


Figure 3. Removing the Front Cover

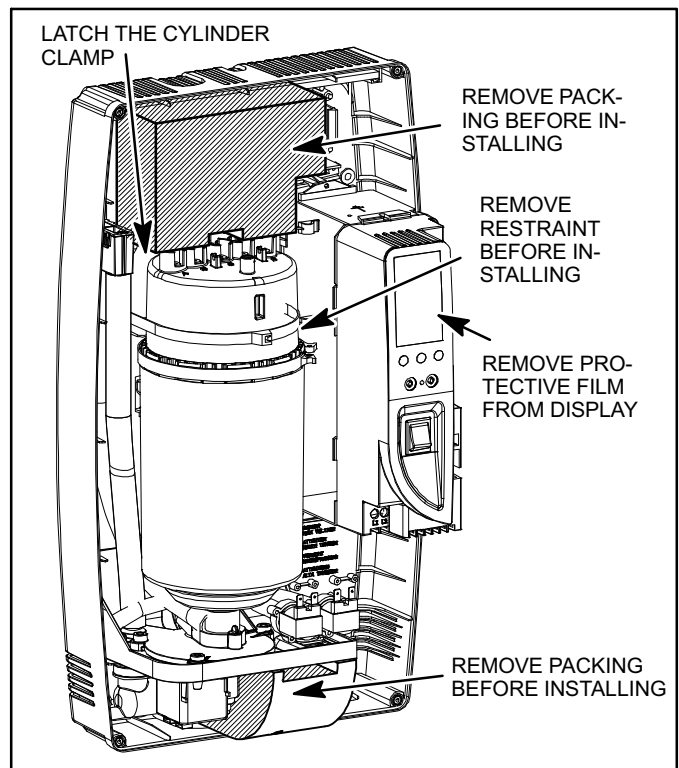
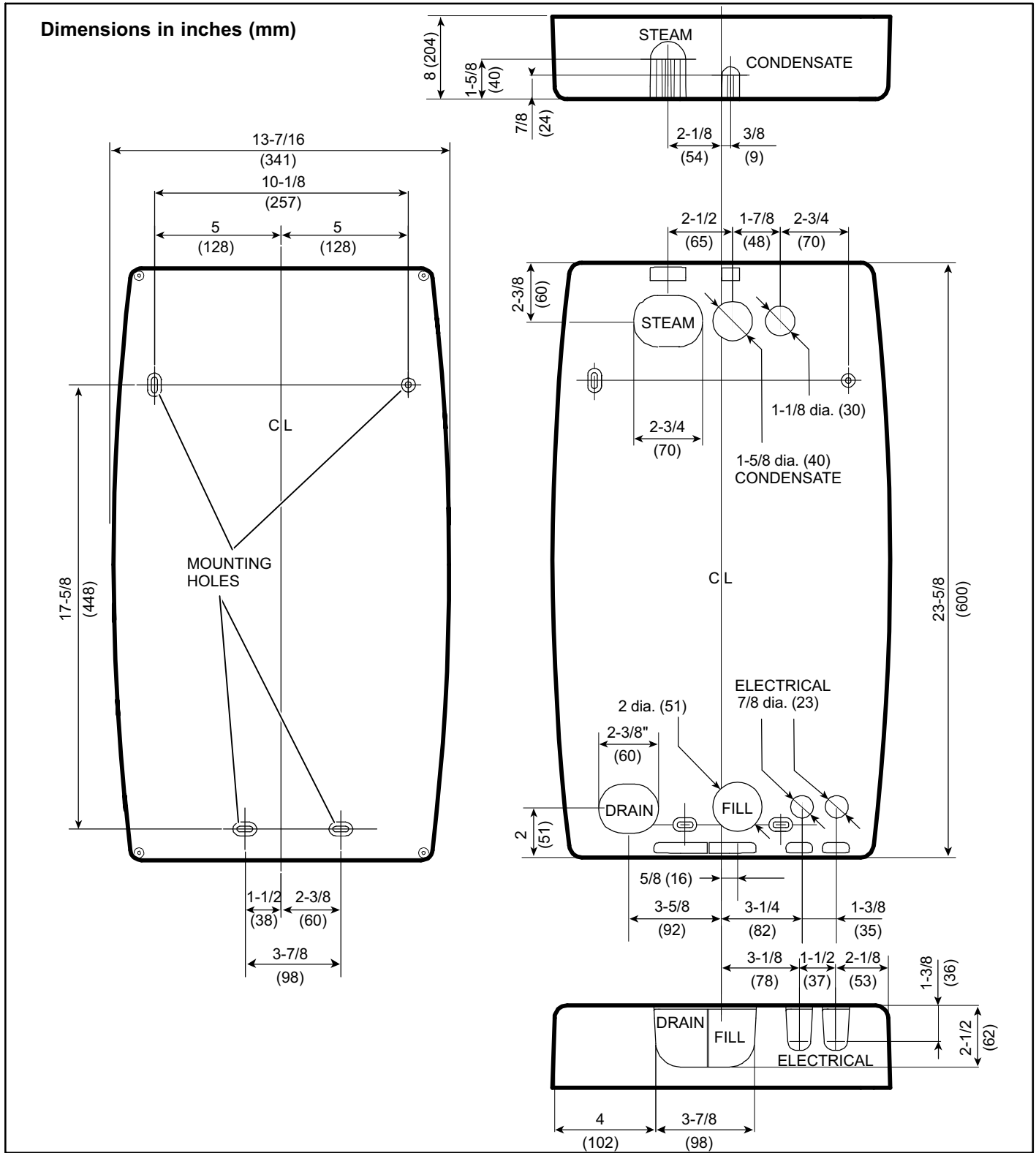


Figure 4. Removing Packing

## Installing Humidifier on a Wall

**Fastening to the Wall**—Drill mounting holes in the wall using the installation template; then secure the humidifier firmly to the wall using the supplied screws and anchors (see figure 5).



**Figure 5. Installation dimensions and details**



## Installing the Air Proving Switch (included)

**IMPORTANT - Failure to install the air proving switch will void the humidifier warranty!**

The air proving switch (Cat. no. Y3786; provided with humidifier) is a differential pressure switch that is required to make sure that the blower is running prior to steam production. Six feet of 3/16" tubing is provided along with two pressure taps (mounting screws are not included) to connect both pressure taps to the switch, however, install the switch first, and then install one pressure tap in only the supply duct (positive pressure application, step 2. below). See figure 6.

### 1. Install Switch and Pressure Tap

Select a mounting location near the supply duct which will not be subject to vibration or where the switch could be damaged. Mount the air proving switch in any vertical plane except with the tubing connections directed upward.

Connect the normally open terminals on the air proving switch to the low voltage terminal strip in the humidifier. See wiring diagrams in figures 14 through 18.

### 2. Positive Pressure Application — Use the positive pressure application when large amounts of air flow or high static is present at the pressure tap in the supply duct.

Install the duct air sampling tap to the supply duct work as close to the switch as possible on the positive side of the blower (see figure 6).

From the 6' tubing provided, cut just enough 3/16" tubing to reach from the pressure tap to the P1 switch port. (P2 remains open).

*NOTE - Check for closure of the blower switch using the lowest blower speed setting. If the switch fails to close the open set of contacts, you must use the differential application.*

### 3. Differential Pressure Application — Use the differential pressure application when small amounts of air flow or low static is present across the pressure tap.

Install the 2nd pressure tap in the return duct work (see figure 6).

Use the remaining 3/16" tubing to connect P2 switch port to the negative pressure tap. Check for closure of the switch when blower is turned on.

## Plumbing

### Water characteristic requirements

The humidifier must be supplied with water with the following characteristics:

- Pressure between 20 psi and 110 psi (0.137 MPa and 0.758 MPa; [1.4 and 7.6 bar])
- Cold water supply
- Flow-rate minimum of 0.21 gpm (0.45 L/m)
- Hardness no greater than 400 ppm<sup>3</sup> of CaCO (40° fH)
- Conductivity from 125 to 1250 µS/cm

- Drinkable and absent of organic compounds
- The characteristics of the water supply must fall within the supply water characteristics outlined in table 2:

### Unacceptable Water Types:

## ! NOTICE

Do not connect water supply near the water heater without using proper plumbing techniques; use a heat trap. Do not install between an expansion tank and water heater. Connect only to cold water line.

- **Softened Water**—as this will lead to foam, electrode corrosion and greatly shortened cylinder life.
- Water containing disinfectants or corrosion inhibitors, as these are potential irritants.
- Industrial water, boiler water or water from cooling circuits.
- Any potentially chemically or bacteriologically contaminated water.
- Heated water.

### Testing Water

A conductivity meter is

recommended for

testing the water: Cat # Y3480 (AP-2 AquaPro Water Quality Tester). Specifications:

EC Range: 0-9999 µS.

Temperature Range: 0-80 °C; 32-176 °F.

Resolution: 1 µS; Temp. resolution is 0.1°C/F.

Accuracy: +/- 2%

Calibration: Digital calibration by push button.

Housing: Water-resistant.

Power source: 1 x 3V button cell (included) (model CR2032).

Dimensions: 15 x 2.8 x 1.3 cm (5.9 x 1.1 x .5 inches) .

Weight: 42.5 g (1.5 oz.).



### Water Supply Connection

The recommended connection between the fill valve and the water supply line is by way of the provided fill hose (5' [1.5 m] hose with one straight 3/4" fitting and one 90 degree 3/4" fitting). The provided hose absorbs water "hammering" in order to avoid fill valve damage.

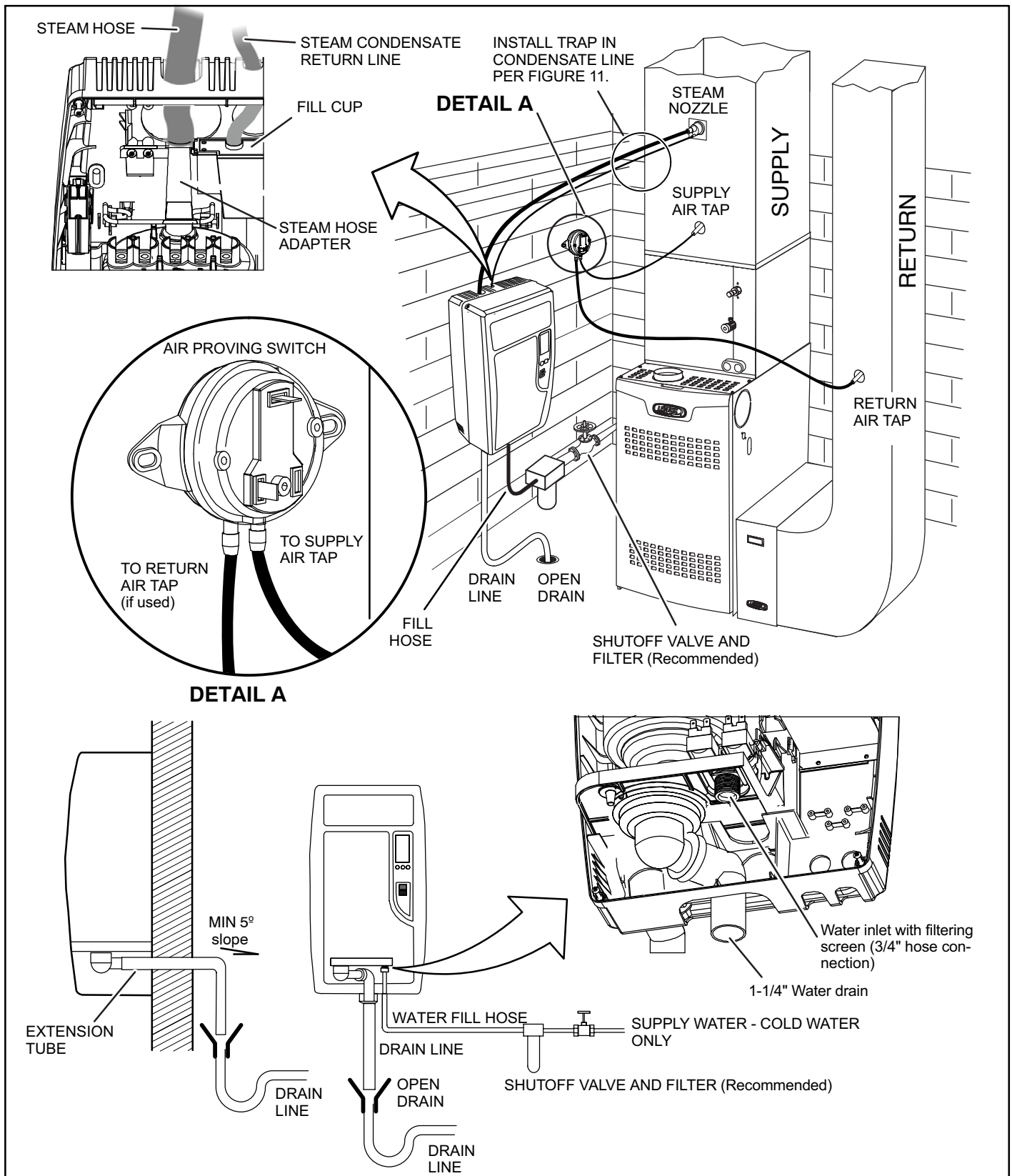
The water line may be routed through the back or through the bottom of the unit. The fitting then threads onto the valve assembly inlet located on the bottom of the humidifier (see figure 6) using a 3/4" female hose connection. Note that there is a strainer built into the fill valve fitting underneath the unit, which will require periodic cleaning, so be sure to allow clearance for access.

## ! NOTICE

Do not use any thread sealant.

Secure fill hose fittings by tightening ¼ turn past hand-tight with a wrench.

Do not use hard piping for direct connection to the humidifier. Only use supplied flexible fill hose or equivalent.



**Figure 6. Typical Installation**

**Table 2. Limit Values for Water Supplying the HCSteam-16/-35 Humidifier**

Limit Values For Normal Water				Limit Values For Low Salt Content Water			
	Units	Min	Max		Units	Min	Max
Specific conductivity ( $\sigma_{R,20^{\circ}\text{C}}$ )	$\mu\text{S/cm}$	350	1250	Specific conductivity ( $\sigma_{R,20^{\circ}\text{C}}$ )	$\mu\text{S/cm}$	125	350
Hydrogen ions (pH)		7	8.5	Hydrogen ions (pH)		7	8.5
Total dissolved solids ( $C_R$ )	mg/l	(*)	(*)	Total dissolved solids ( $C_R$ )	mg/l	(*)	(*)
Dry residue at 180°C ( $R_{180}$ )	mg/l	(*)	(*)	Dry residue at 180°C ( $R_{180}$ )	mg/l	(*)	(*)
Total hardness	mg/l $\text{CaCO}_3$	100	400	Total hardness	mg/l $\text{CaCO}_3$	50	160
Temporary hardness	mg/l $\text{CaCO}_3$	60	300	Temporary hardness	mg/l $\text{CaCO}_3$	30	100
Iron + Manganese	mg/l Fe + Mn	(no min)	0.2	Iron + Manganese	mg/l Fe + Mn	(no min)	0.2
Chlorides	ppm $\text{Cl}^-$		30	Chlorides	ppm $\text{Cl}^-$		20
Silica	mg/l $\text{SiO}_2$		20	Silica	mg/l $\text{SiO}_2$		20
Chlorine residue	mg/l $\text{Cl}_2$		0.2	Chlorine residue	mg/l $\text{Cl}_2$		0.2
Calcium sulphate	mg/l $\text{CaSO}_4$		100	Calcium sulphate	mg/l $\text{CaSO}_4$		60

(\*) Values dependent on the specific conductivity: in general:  $C_R = 0.93 * \sigma_{R, 20^{\circ}\text{C}}$ ;  $R_{180} = 0.65 * \sigma_{R, 20^{\circ}\text{C}}$   
 Note: There is no relationship between the hardness and conductivity of water.

## Water Drain

### **⚠ WARNING**

The drain pipe must be free without back pressure. We recommend an external anti-flooding device (not supplied) to protect from faults of external hydraulic circuits.

The HCSteam-16/-35 humidifier also requires a connection to a drain. The drain line may be routed out the back or bottom of the unit using the included angle fitting. The drain line can be 1-1/4" PVC, CPVC or polypropylene tubing (drain line must be able to withstand 140°F water). The drain line is not glued or otherwise attached to the humidifier so it must be supported by itself. The humidifier includes a drain tempering valve that runs whenever the drain pump runs and flushes cool water into the drain line to insure the drain water temperature never exceeds 140°F (60°C).

When only a 1" or 3/4" drain is available, a temporary drain reservoir can be constructed as shown in figure 7. This is a field supplied device. Devices such as the one shown have been tested and are approved to be used with the HCSteam in the described applications.

The drain water from the HCSteam is diverted into the top opening of the riser pipe. The figure shown also acts as an air gap and allows the drain water from the HCSteam to empty via gravity into the available 3/4" drain.

The reservoir can be constructed from field supplied plumbing fittings (PVC, CPVC, PEX, etc.) rated for 140 F drain water applications. The reservoir in the diagram is constructed with the following:

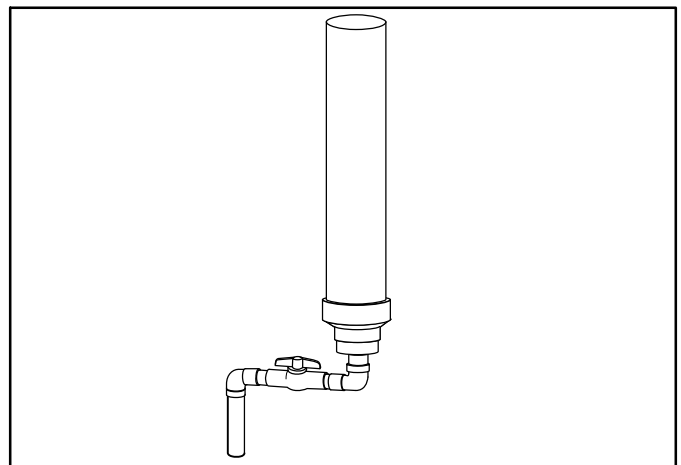
- 4 in. x 12 in. PVC Sch. 40 DWV plain-end pipe
- 4 in. x 2 in. PVC reducing coupling/bushing
- 2 in. x 3/4 in. bushing
- 3/4 in. elbows and valve

If 3 in. pipe is used, it should be at least 21 in. long. The elbows and valve shown allow more flexibility when aligning humidifier drain with existing drain line. A drain trap can also be incorporated into this fixture where needed.

If a condensate pump is required, it must be able to pump the volume and temperature listed below at the installed lift. Hartell A5 series condensate pumps are capable of meeting the pumping requirements up to 24 foot lift.

The drain water characteristics are:

- Drain Rate 7.1 gal/min. (26.8 lit/min.)
- Connection 1-1/4" (32mm)
- Temperature 140°F (60°C)



**Figure 7. Slow / Restricted Drain Lines (3/4")**

### Drain Connections

When using a rear outlet drain passing through drywall, we suggest using a 1-1/4" extension tube. When using a bottom outlet drain, attach the included 90° fitting to the drain outlet. The drain outlet may be rotated. Then connect a 1-1/4" trap adaptor to connect to drain pipe.

## Steam Distribution

### **⚠ CAUTION**

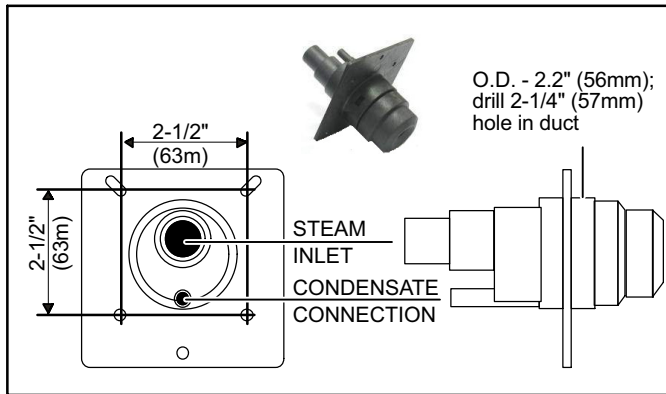
Do not touch steam hose when humidifier is operating!  
 The steam hose is a heated part. Allow to cool before servicing.

### Duct Steam Injection

The maximum allowed duct static pressure is 2" w.c.



The HCSteam-16/-35 humidifier include a plastic injection nozzle (figure 8).



**Figure 8. Plastic Injection Nozzle**

A typical installation is shown in figure 6.

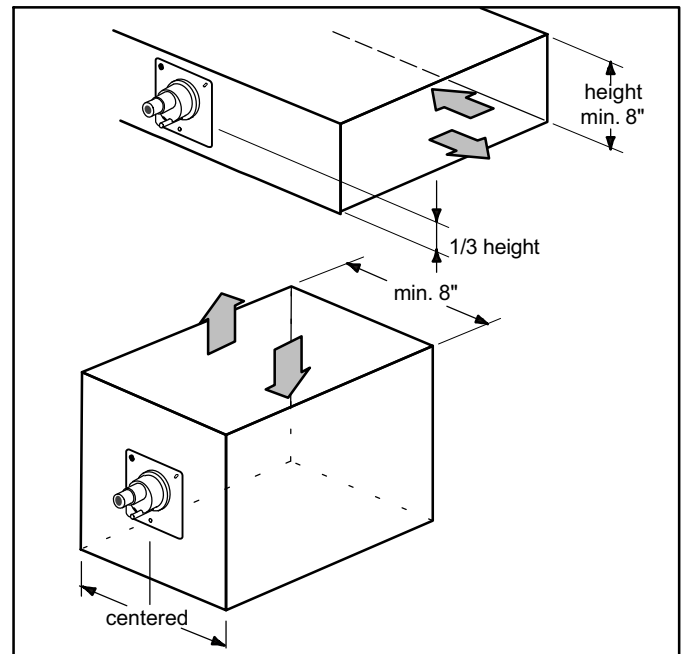
## ⚠ NOTICE

Nozzle location is very important to the proper absorption of the steam in the air stream. Select a location observing the following:

- nozzle must be installed in supply duct,
- nozzle location must be easily accessible,
- nozzle location must allow at least 3' (1m) of straight metal duct without elbows or obstructions,
- duct must be un-insulated interior, and if in unconditioned spaces, insulated exterior,
- clearances shown in figure 9 must be maintained.

### Installing Return Condensate Hose

The return condensate hose from the nozzle must be trapped. Coil the hose into a vertical loop and secure it below the nozzle. This trap prevents steam from being released into the cabinet. The hose end may be run through the knockout at the top of the humidifier and be inserted into the hole located on top of the fill cup. See figures 6 and 11.



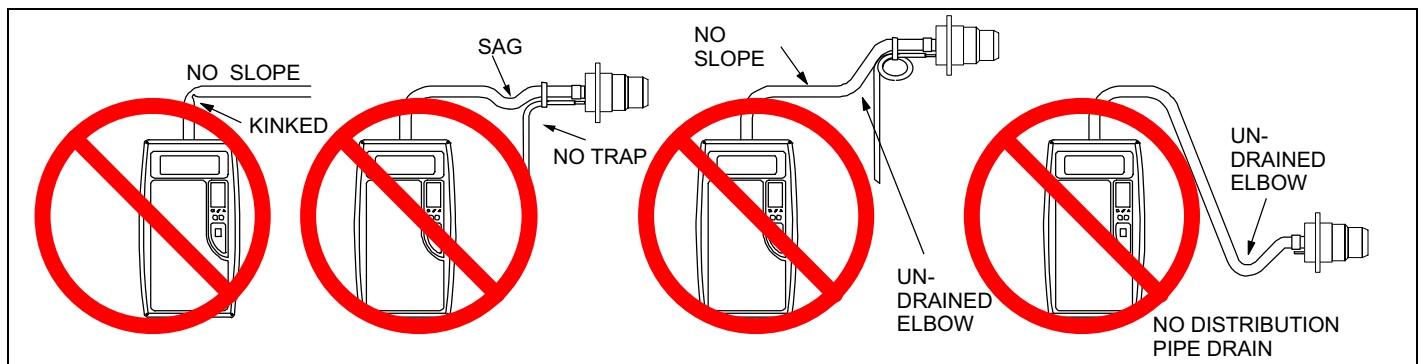
**Figure 9. Plastic Nozzle Installations**  
**Installing Steam Hoses**

## ⚠ NOTICE

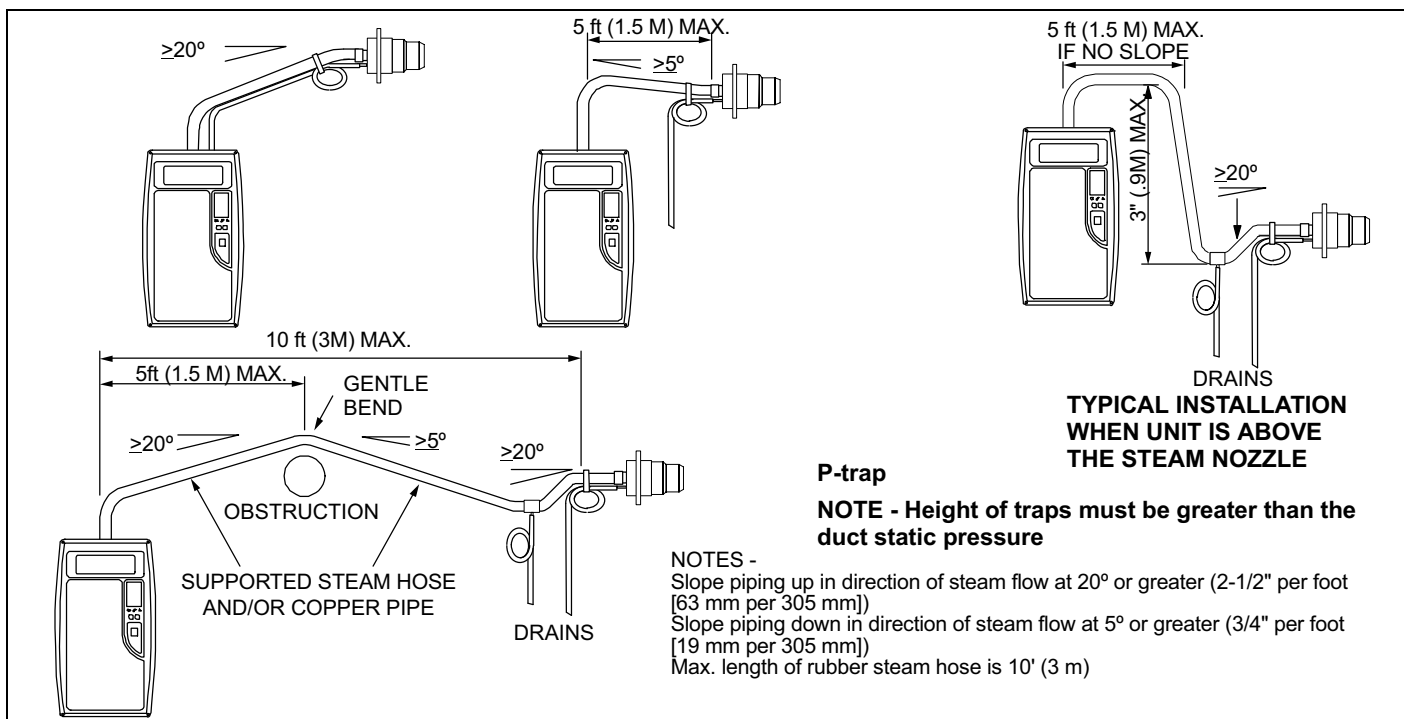
Ninety percent (90%) of all operation problems are created by improper steam piping from the humidifier unit to the duct steam nozzle.

Make the connection between the humidifier steam hose adapter and nozzle using only the provided hose (unsuitable hoses may weaken and crack causing steam leaks).

- Avoid the formation of pockets or traps where condensate may form.
- Avoid choking the hose due to tight bends or twisting.
- Fasten the end of the hose to the steam hose adapter on the humidifier and the steam nozzle using metal hose clamps, so that these do not detach due to the high temperature.



**Figure 10. Unacceptable Examples of Installing Steam Hoses**



**Figure 11. Installing Steam Hoses**

**NOTE -** Maximum length of rubber steam hose is 10 ft. (3 m). Insulated copper tubing may be up to 20 ft. (6 m) in length. In all cases, minimize sharp bends and elbows. Use 2 - 45° elbows instead of 90° elbows. Hose inner diameter = 7/8" (22 mm); Hose outer diameter = 1-1/4" (30 mm).

## Wiring

### Power Wiring

All wiring must be in accordance with local, state and national electric codes.

Model	Power supply (single phase)	Steam Output lbs/hr (kg/h)	kW	Amps	External Power Wire Gauge	External Fuse (A) or Breaker
HCTesteam-16	110 VAC 50/60Hz	5.5 (2.5)	1.80	16.40	AWG10	25
HCTesteam-35	230 VAC 50/60Hz	12 (5.4)	3.89	16.95	AWG10	25

## ⚠ WARNING

### ELECTRIC SHOCK HAZARD!

The humidifier uses electrical power.

Always disconnect the main power before opening or servicing the humidifier!

**NOTE -** To avoid unwanted interference, the power cables should be kept separate from any control wiring.

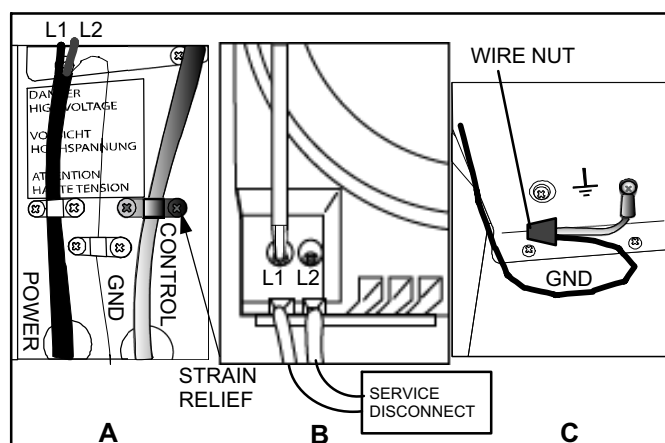
**NOTE -** Tolerance allowed on main voltage = -15% to +10%.

Insert the power and ground connection cables into the electrical panel compartment using the strain reliefs supplied (see figure 12, A), and connect to the terminals. An external fused disconnect must be installed.

Check that the power supply voltage to be connected matches the value indicated on the rating plate inside the electrical panel.

Connect power wires to the power terminal block located at the bottom left of the control module, polarity does not matter (see figure 12, B).

Connect the ground wire to the unit's chassis ground, located just behind the power wiring terminal block (see figure 12, C).



**Figure 12. Power Wiring Connections**

## Control Wiring

The humidifier is controlled by humidistat and safety devices such as high-limit humidistat, air proving switch, and remote on/off.

The humidifier is operated by the closing of a mechanical humidistat, or by the closing of a normally open dry contact. The most common is a combination of a humidistat and air proving switch. Diagrams A and B in figure 13 show the routing to the terminal block.

Connect control devices to humidifier using the diagrams shown in figures 14 through 18. Following each diagram is

an explanation of the sequence of operation associated with each wiring configuration.

## Air Proving Switch and Safety Switches

Remove the jumper between terminals AB-AB and connect air proving switch. DO NOT apply any voltage to AB-AB.

Thread the control wiring through the bottom of the unit, and the strain relief (see figure 13) and then up the side of the control module to the top right wiring terminal blocks. Connect the control wiring to the control wiring terminal blocks found at the top right side of the control module.

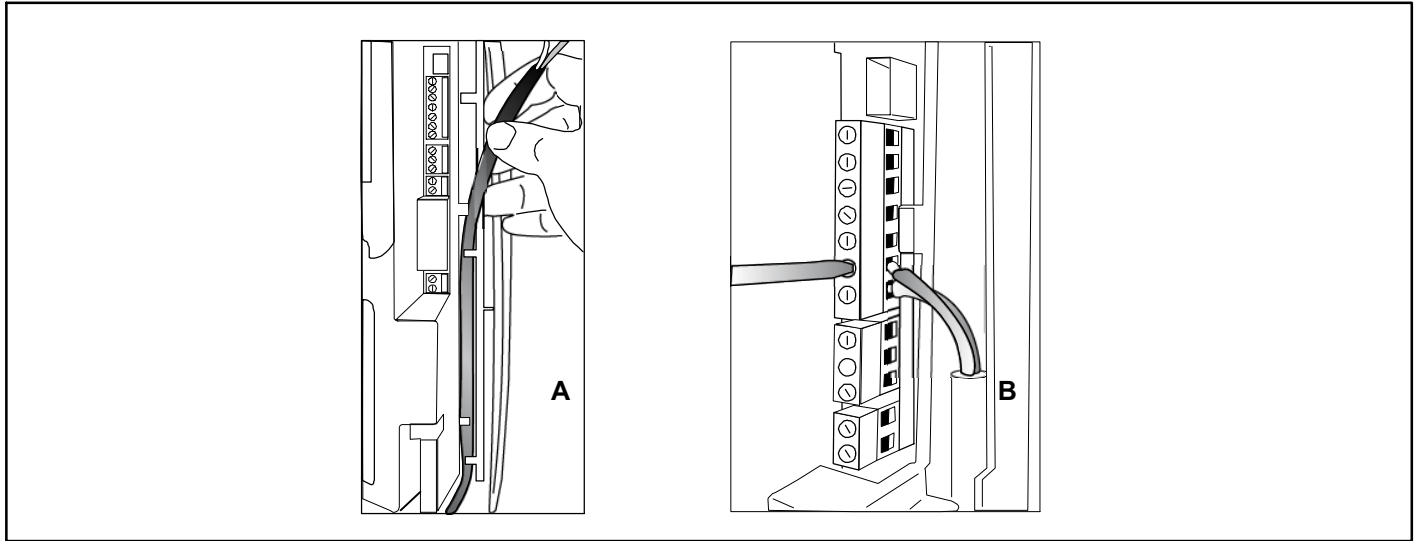


Figure 13. Routing Control Wiring to Terminal Block

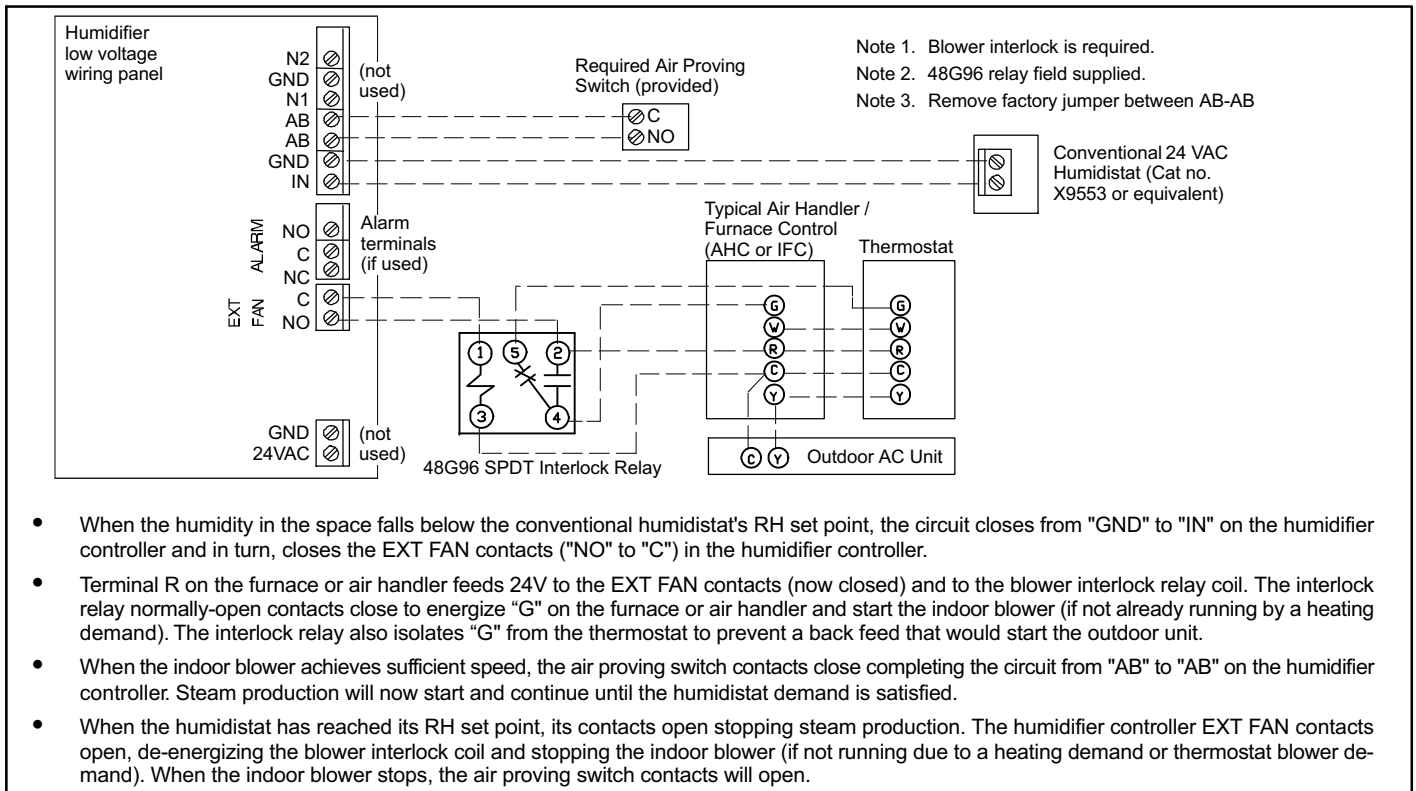
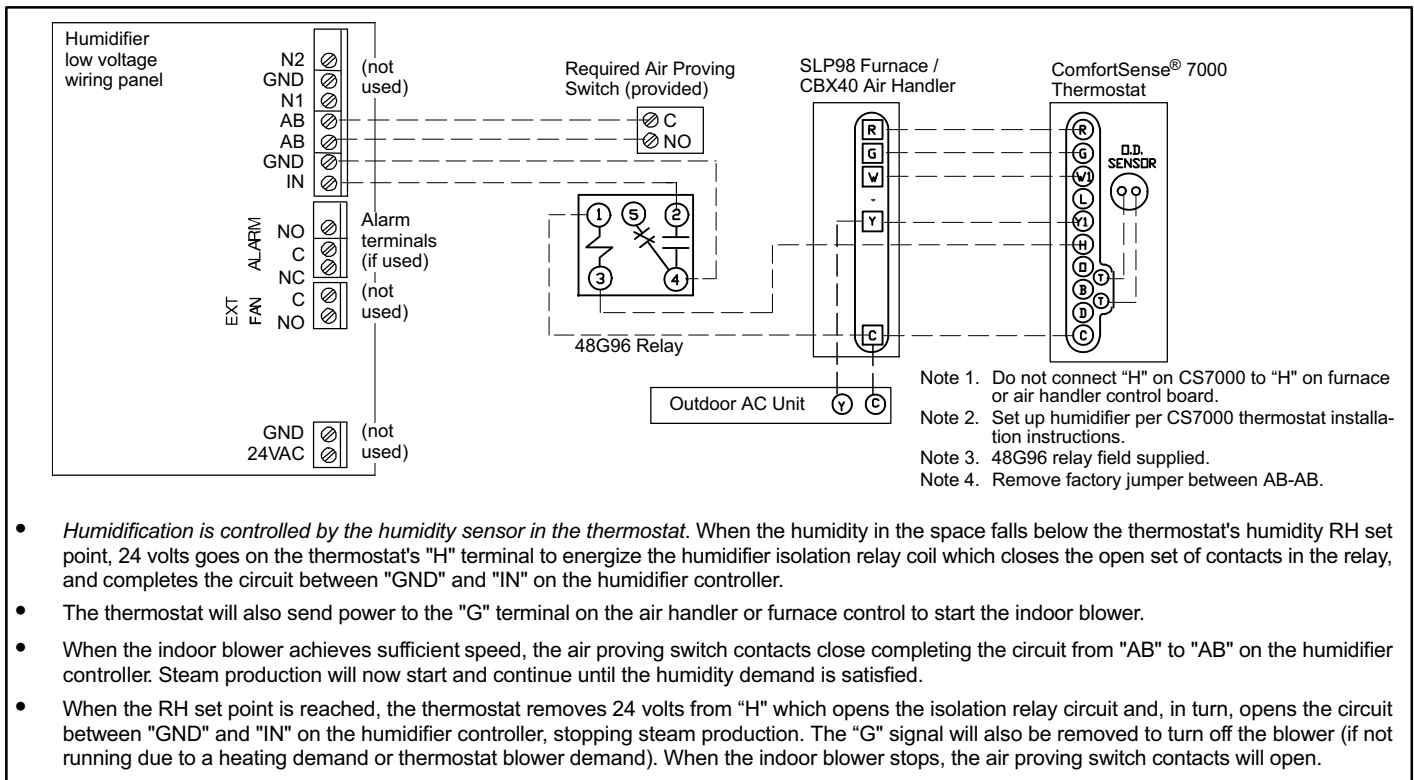
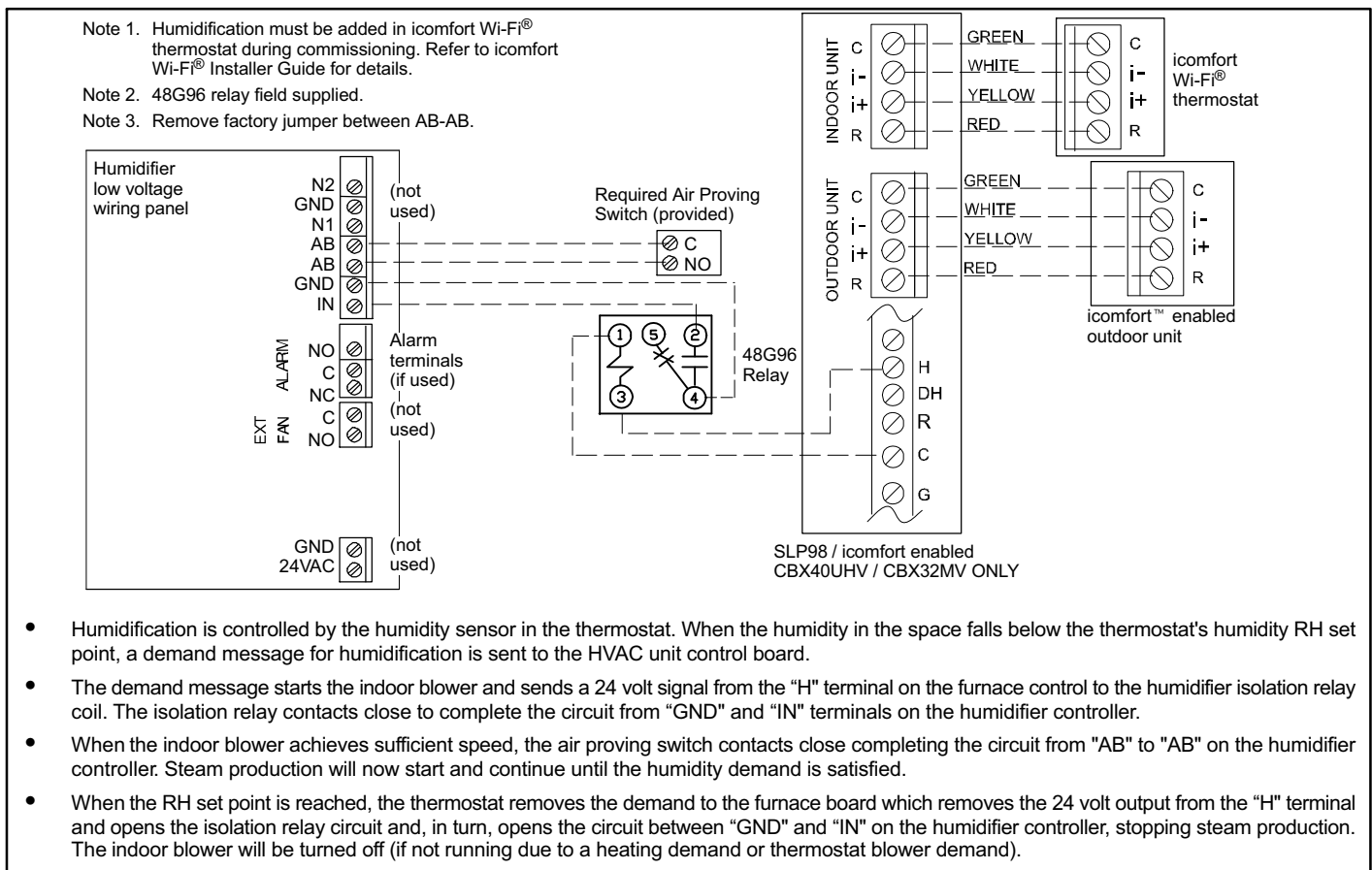


Figure 14. Humidifier with Conventional 24V Humidistat and Interlocked with HVAC Blower

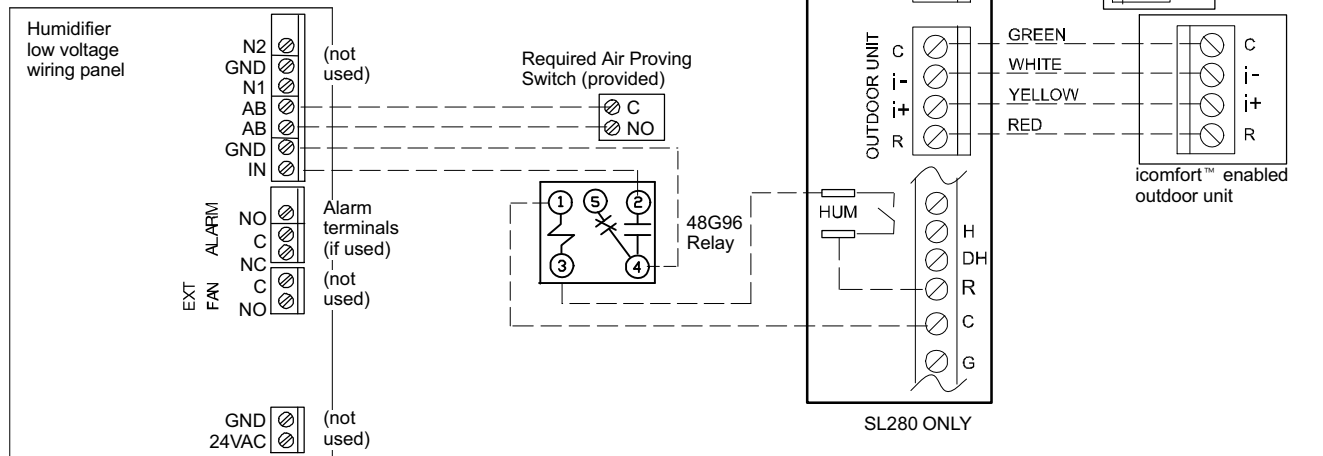


**Figure 15. Humidifier with ComfortSense® 7000 thermostat used as Humidistat and Interlocked with HVAC Blower**



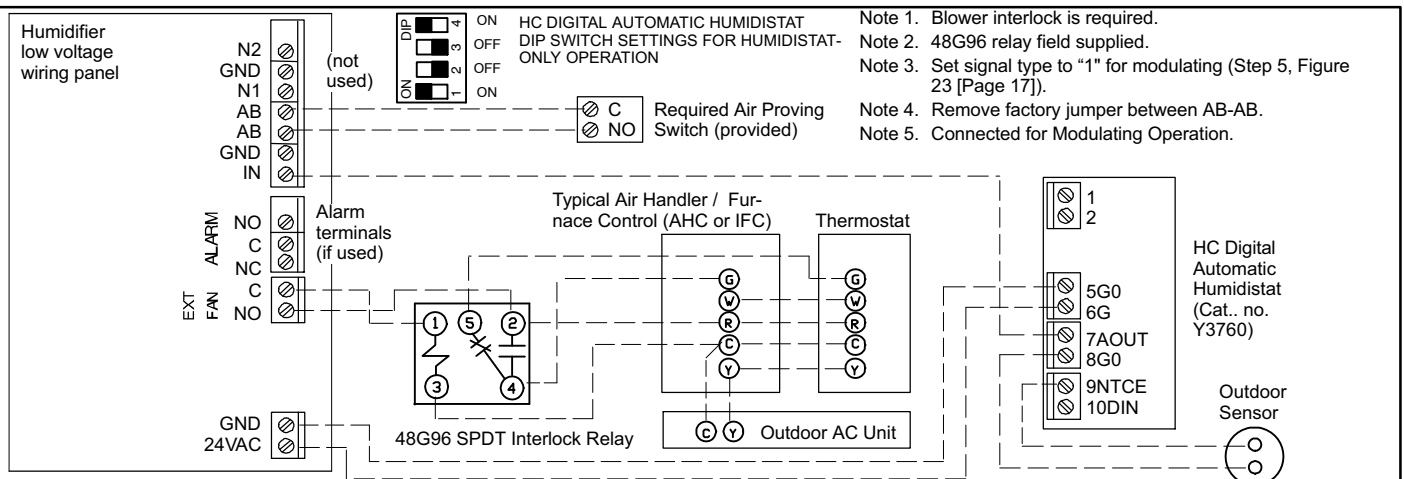
**Figure 16. Humidifier with icomfort Wi-Fi® Thermostat used as Humidistat with an icomfort™ enabled SLP98 Gas Furnace or icomfort™ enabled CBX40UHV or CBX32MV Air Handler**

- Note 1. Humidification must be added in icomfort Wi-Fi® thermostat during commissioning. Refer to icomfort Wi-Fi® Installer Guide for details.
- Note 2. 48G96 relay field supplied.
- Note 3. Remove factory jumper between AB-AB.



- Humidification is controlled by the humidity sensor in the thermostat. When the humidity in the space falls below the thermostat's humidity RH set point, a demand message for humidification is sent to the furnace control board.
- The demand message starts the indoor blower and closes the "HUM" contacts on the furnace control. 24 VAC passes through a field-installed jumper from the "R" terminal on the control board, through the closed "HUM" terminals, and to the humidifier isolation relay coil. The isolation relay contacts close to complete the circuit from "GND" and "IN" terminals on the humidifier controller.
- When the indoor blower achieves sufficient speed, the air proving switch contacts close completing the circuit from "AB" to "AB" on the humidifier controller. Steam production will now start and continue until the humidity demand is satisfied.
- When the RH set point is reached, the thermostat removes the demand to the furnace board which opens the HUM contacts, opens the isolation relay circuit and, in turn, opens the circuit between "GND" and "IN" on the humidifier controller, stopping steam production. The indoor blower will be turned off (if not running due to a heating demand or thermostat blower demand).

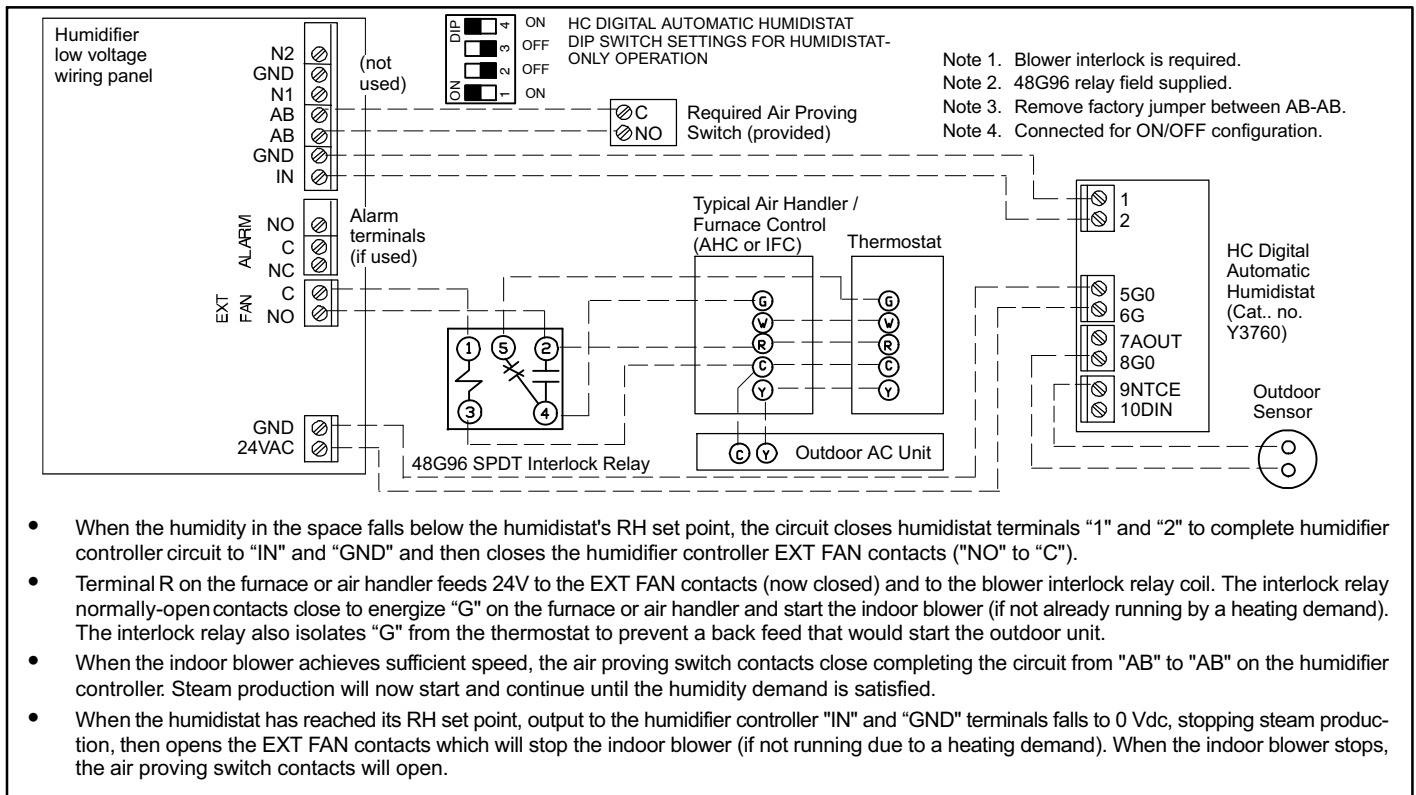
**Figure 17. Humidifier with icomfort Wi-Fi® thermostat used as Humidistat with an icomfort™ enabled SL280 Gas Furnace**



- Steam production is modulated between 20% and 100% of the maximum production proportionally to the signal provided by the humidistat. When the humidity in the space falls below the humidistat's RH set point, the humidistat sends a 0 to 10Vdc from "7AOUT" terminal to the "IN" terminal on the humidifier controller and in turn, closes the EXT FAN contacts ("NO" to "C") in the humidifier controller.
- Terminal R on the furnace or air handler feeds 24V to the EXT FAN contacts (now closed) and to the blower interlock relay coil. The interlock relay normally-open contacts close to energize "G" on the furnace or air handler and start the indoor blower (if not already running by a heating demand). The interlock relay also isolates "G" from the thermostat to prevent a back feed that would start the outdoor unit.
- When the indoor blower achieves sufficient speed, the air proving switch contacts close completing the circuit from "AB" to "AB" on the humidifier controller. Steam production will now start and continue until the humidity demand is satisfied.
- When the humidistat has reached its RH set point, its contacts open stopping steam production. The humidifier controller EXT FAN contacts open, de-energizing the blower interlock coil and stopping the indoor blower (if not running due to a heating demand or thermostat blower demand). When the indoor blower stops, the air proving switch contacts will open.

**Figure 18. Humidifier with HC Digital Automatic Humidistat Connected for Modulating Operation**





**Figure 19. Humidifier with HC Digital Automatic Humidistat Connected for ON/OFF Operation**

#### Interlock between HCSteam-16/-35 Humidifier and Furnace or Air Handler Fan

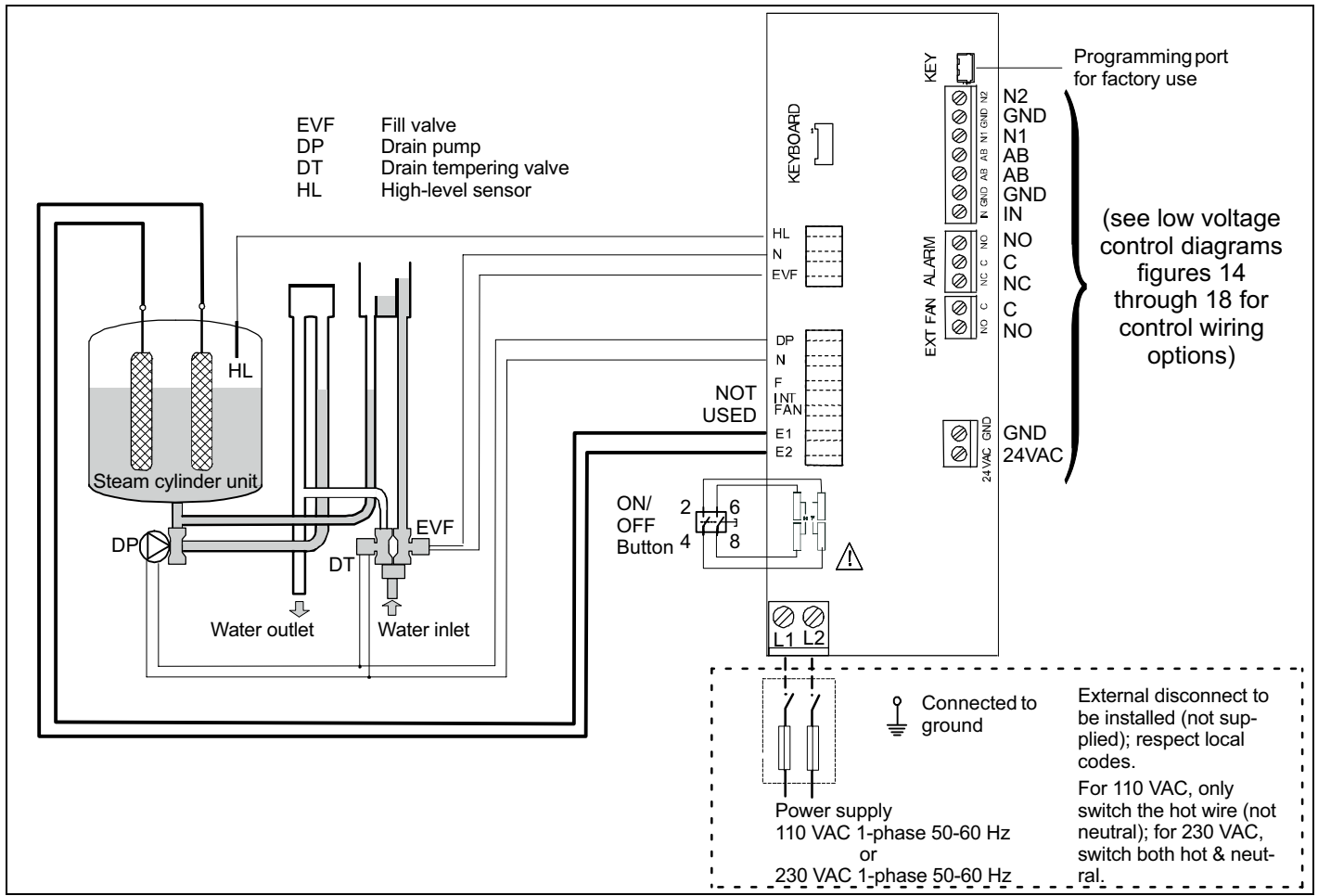
The following sequence of events must occur for HCSteam-16/-35 to produce steam:

- External humidistat contacts must close between terminals IN and GND providing a steam humidification demand.
- The air proving switch NO contacts wired between humidifier terminals AB and AB must close when significant air volume is provided to allow the humidifier to operate.

The HCSteam-16/-35 humidifier must be connected to an air proving switch (that is, a device that senses the flow of air in the duct provided by the furnace or air handler). This air proving switch should be connected to the remote enabling input (terminals AB-AB). In some applications a field-provided limit humidistat (normally closed) may be installed in series with the air proving switch connected to terminals AB-AB).

**Table 3. Wiring Connections**

Terminals	Functions	Electrical specifications
L1-L2 -GROUND	Power supply and Ground connections	Power supply 110 VAC 1-phase 50-60Hz 1.86kW or 230 VAC 1-phase 50-60Hz 4.05kW
KEY	Programming port	Connecting to Programming port or supervisor (factory use only)
AB-AB	Remote enabling input	Imposes an external NO contact ; Rmax=300 Ohm; Vmax=33 Vdc; Imax=6mAdc; humidifier enabled = contact closed
IN-GND	Control signal input	Humidistat connection
NC-C-NO	NC alarm contact Common alarm contact NO alarm contact	250V; 8Amp max with resistive load; 4 Amp max with inductive load. In the event of an active alarm, the alarm LED will come on and the relay is energized.
NO-C	External fan relay	250V; 8Amp max with resistive load; 4 Amp max with inductive load
24-GND	Power for external humidistat	Power supply for external humidistat 24 VAC; 2 Watt



**Figure 20. Humidifier Internal Controller Wiring Diagram**

## Start-Up

### HCSteam-16/-35 Humidifier Controller

The HCSteam-16/-35 humidifier controller features a comprehensive information display that shows the operation of the system at a glance:

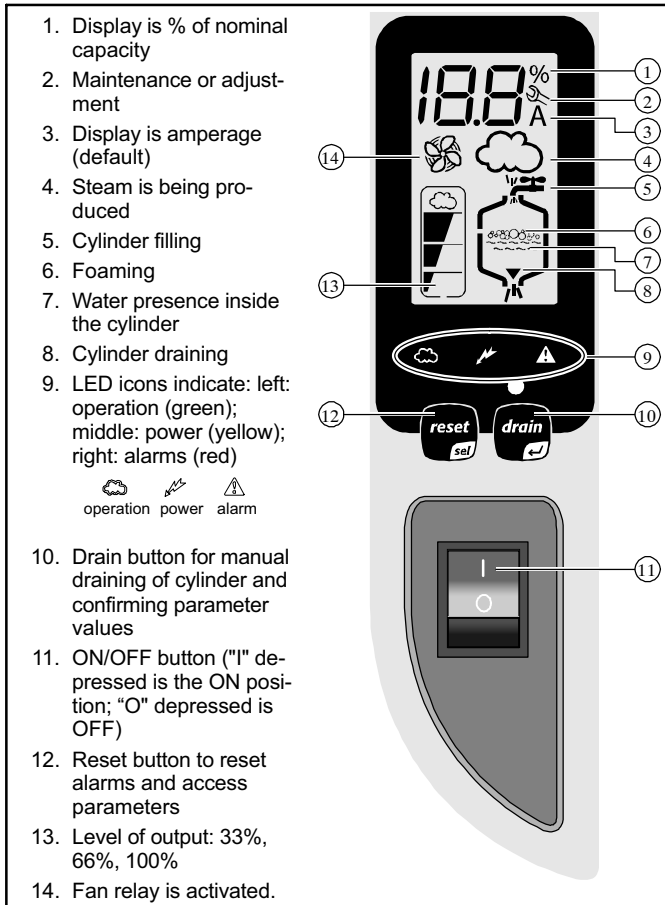


Figure 21. Humidifier Controller

## ⚠ WARNING

Before starting, check that the humidifier is in perfect condition, that there are no water leaks and that the electrical parts are dry.

Do not connect power if the humidifier is damaged or even partially wet!

When installation is complete, flush the supply pipe for 10 minutes by piping water directly into the drain, without sending it into the humidifier; this will eliminate any scale or residues that may cause foam when boiling.

### Pre Start-up Checklist

Before starting the humidifier, the following should be checked:

- Water is connected, the line has been flushed, and external valves are open.
- Drain is connected, run to an open drain, and has a trap under the unit.
- Electricity is connected in accordance with instructions, local codes and data labels in the unit.
- Make sure all electrical connections to the cylinder are tight.
- The power fuses are installed and intact.
- All control wiring is complete and tested.
- Air proving switch is wired to close when air flow is proved.
- Hi-limit humidistat (if used) is wired to open on humidity rise above setpoint.
- Unit wires have been checked to make sure they and all connectors are tight from shipping.
- The steam hose(s) are run correctly with no sags or kinks and sloped properly according to the manual.
- Condensate hoses are run correctly with no sags or kinks and sloped properly according to the manual.
- An auxiliary drain pan and float switch are installed under humidifier if humidifier is installed in area where a water leak could cause damage.

### Humidifier Start-up Checklist

- Insure that the external power to the humidifier is on.
- Press the "I" part of the On/Off button IN. The yellow Power LED (middle) will light. The HCSteam-16/-35 humidifier is now ready to operate.
- With a call for humidity, the humidifier will close its power relays and send power to the electrodes in the plastic steam generator. The green Operation LED will light, indicating that operation has begun.

### Operation Checkout

Check that the air proving switch closes on the lowest blower speed:

- After 10 minutes of operation, check duct for signs of excessive condensation or wetness by inspecting inside of duct (using an access door or by removing the nozzle).
- If wetness exists, increase blower cfm or reduce humidifier output capacity, see figure 23 on page 17.

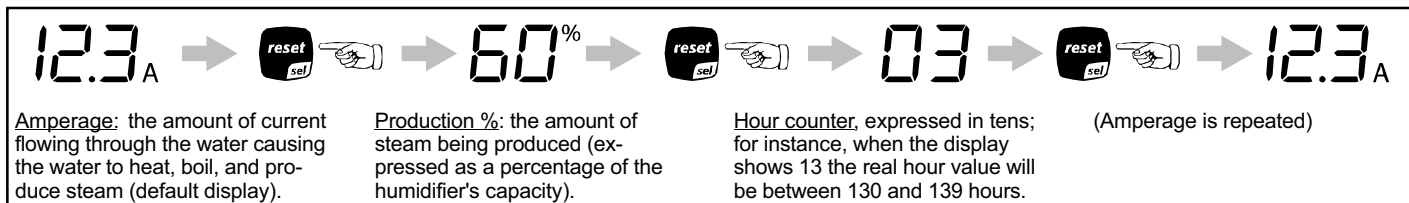

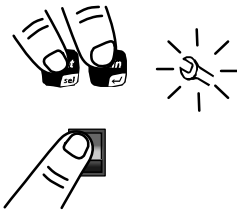




Figure 22. Displaying Information

### Initial Start-up with New Cylinder

Flush the cylinder to remove trace contaminants in the cylinder and water lines after new installations and after cylinder maintenance. Flushing prevents contaminants from causing excessive foaming during initial cylinder start-up. The cylinder flushing cycle can produce drainage from the HCSteam beyond the high-capacity condensate pump tank and pumping capacity when installed in applications with over a 24 foot lift.

When starting with a new cylinder, you should activate the cylinder cleaning function as follows:

1. Make sure the humidifier switch is off (press "O" part of switch). 
2. While pressing and HOLDING both "reset/sel" and "drain" buttons, switch the humidifier back on. DO NOT release "reset/sel" and "drain" buttons until the wrench icon blinks; then release both buttons. 
3. Press and hold "reset/sel" until the display shows 04. WARNING: DO NOT confirm any value higher than 04. If 05 or higher is displayed, press "reset/sel" until the display goes back to the normal operating mode and restart from step 1. 
4. Press and hold "drain" (minimum 1 second); the cleaning starts. 
5. Reset the hour counter as per the instructions on page 18.

During cleaning, the electrodes are powered and water fills until it touches the high-level sensor or the phase current equals 20A, whichever occurs first. After either of the events is detected, the steam cylinder is fully discharged with the electrodes un-powered (the drain pump and the drain tempering valve are activated for 3 minutes). Lennox recommends to perform two cleanings when starting a new humidifier. After the cleaning ends, the humidifier starts regular operation. The HCSteam-16/-35 humidifier is now ready for operation.

### Operation

#### Displaying Information

By pressing the "reset/sel" button for 2 seconds, the display will loop from amperage to production in % of the maximum production to the hour counter and back to amperage (see figure 22).

#### Selecting the Signal Type

**NOTE** - The HCSteam-16/-35 humidifier is preset for a manual humidistat with only an ON/OFF feature and normally does not require any change. Should the need ever arise to reset it, proceed as follows:


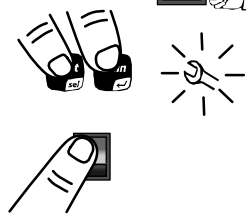

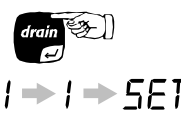



1. Switch the humidifier off. 
2. While pressing and HOLDING both "reset/sel" and "drain" buttons, switch the humidifier back on. DO NOT release "reset/sel" and "drain" buttons until the wrench icon blinks; then release both buttons. 
3. Press "reset/sel" until the display shows 02. DO NOT confirm any value higher than 02. Values of 03 or higher not applicable for these models. If value is higher than 02, press "reset/sel" until the display goes back to the normal operating mode and restart from step 1. 
4. Press and hold "drain" (minimum 1 second); the display shows "P1" then the present signal type and then "set". 
5. Press "reset/sel" for signal type of 0 or 1:  
0 = On-Off humidistat  
1 = external 0...10 Vdc modulating signal humidistat. 
6. Press and hold "drain" (minimum 1 second) when done to confirm the new value of P1 and exit to the normal operating mode. 
7. Switch the humidifier off. 

Figure 23. Selecting Signal Type

**Table 4. Humidification Load Required, Gallon/day [Liter/day] (Ref: AHRI-Guideline F-2008)**

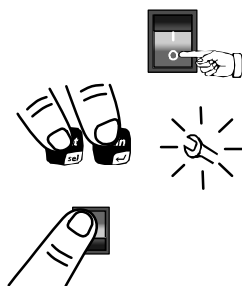
Type of Construction	Volume of Building ft <sup>3</sup> [m <sup>3</sup> (approximate)]							
	8000 [227]	10000 [282]	12000 [340]	16000 [453]	20000 [566]	24000 [680]	32000 [906]	40000 [1133]
Tight	4.3 [16]	5.3 [20]	6.4 [24]	8.5 [32]	10.6 [40.2]	12.7 [48.2]	17.0 [64.4]	21.2[80.4]
Average	8.6 [32]	10.6 [40.2]	12.8 [48.4]	17.0 [64.4]	21.3 [80.2]	25.4 [96.5]	34.0 [148]	42.6 [160]
Loose	12.7 [48.3]	15.9 [60.3]	19.1 [72.6]	25.5 [96.6]	31.8 [121]	38.1 [145]	51.0 [193]	63.6 [241]
Legend:	HCSteam-16			HCSteam-35		Exceeds capacity of HCSteam units		

### Changing the Maximum Production Percentage

The maximum production can be adjusted between 20% and 100% of the nominal production in steps of 5% in order to suit either the 110 VAC or 230 VAC unit. Default settings are factory set at 100% (110 VAC unit) 70% (230 VAC unit). Adjust capacity per humidity calculation or system application air flow. Table 4 shows the humidification load requirements. This chart will be helpful in setting the correct production percentage.

1. Switch the humidifier off.

2. While pressing and HOLD-ING both “reset/sel” and “drain” buttons, switch the humidifier back on. DO NOT release “reset/sel” and “drain” buttons until the wrench icon blinks; then release both buttons.



3. Press “reset/sel” until the display shows 01. DO NOT confirm any value higher than 01. Values of 02 or higher not applicable for these models. If value is higher than 01, press “reset/sel” until the display goes back to the normal operating mode and re-start from step 1.



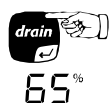
4. Press and hold “drain” (minimum 1 second); the display shows “P0” then the current maximum production percentage and then “set”.



5. Press “reset/sel” to change the Maximum Production in steps of 5% between 20% and 100%.



6. Press and hold “drain” (minimum 1 second) to confirm the new maximum production percentage and exit to the normal operating mode.

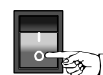


**Figure 24. Changing Maximum Production Percentage**

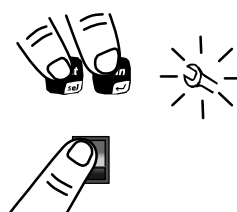
### Resetting the Hour Counter

The hour counter must be reset every time the cylinder is changed in order to reset and restart the internal maintenance timer:

1. Switch the humidifier off.



2. While pressing and HOLD-ING both “reset/sel” and “drain” buttons, switch the humidifier back on. DO NOT release “reset/sel” and “drain” buttons until the wrench icon blinks; then release both buttons.



3. Press “reset/sel” until the display shows 03. DO NOT confirm any value higher than 03. Values of 04 or higher not applicable for these models. If value are higher than 03, press “reset/sel” until the display goes back to the normal operating mode and re-start from step 1.



4. Press and hold “drain” (minimum 1 second) to confirm: the hour counter will be reset at once and HCSteam-16/-35 humidifier will go back to the normal operating mode.



**Figure 25. Resetting Hour Counter**

### Activating the Manual Drain

Press and hold the “drain” button on the front of the unit until the cylinder is drained.

*NOTE - Water will continue to flow from the tempering valve after the cylinder is empty. Draining should take around 20 seconds if the cylinder was full.*

### Sequence of Operation

For a complete description of how the humidifier operates using the various control devices, see the wiring section (page 11 through page 13).



## Alarms

In the event of an alarm, the red alarm LED (▲) will flash, the alarm relay will energize and the alarm code will flash in the display. Multiple alarms will flash in sequence, alternating with the main display. Pressing the **"reset/sel"** button for 2 seconds will reset the alarms, although still active alarms will continue to display.

Alarms				
Display	Description	Action	Red Alarm Symbol	Notes
--	Remote on-off open.	Unit disabled.	Off	
EE	Internal memory error.	Unit disabled.	On	Replace control for EE & E0
E0	Control board configuration not valid.	Unit disabled.	On	
E1	High current alarm.	Unit disabled.	On	Turn off, check connections, check cylinder (no limescale bridges between electrodes, no electrodes short-circuited). Use a ohm-meter to check whether they are short-circuited. Look through the steam outlet to see whether the electrodes are loose.
E2	Low production, low supply water conductivity or excessive foam/limescale in the cylinder.	Unit disabled. Press <b>"reset/sel"</b> key for 1 seconds to reset.	On	Check supply water conductivity (too low?), replace the cylinder.
E3	Cylinder almost exhausted, already used for 2000 hrs.	Press <b>"reset/sel"</b> key for 1 seconds to reset.	Off	Change cylinder (not urgent).
E4	Fill alarm, unable or slow fill (current does not increase within timeout).	Press <b>"reset/sel"</b> key for 1 seconds to reset, otherwise the warning will be reset automatically every 10 minutes until the supply water is available again.	On	Check water supply, water inlet strainer, and fill valve; check drain pump for leakage.
E5	Drain alarm, unable to drain (current does not decrease within timeout).	Press <b>"reset/sel"</b> key for 1 seconds to reset.	On	Check drain pump operation; check drain connection.
E6	Cylinder exhausted (critical performance detected).	The warning is automatically reset if HCSteam-16/-35 can produce the demand, otherwise turn off and then on.	Off	Change cylinder (urgent).
E7	Foam detected.	Press <b>"reset/sel"</b> key for 1 seconds to reset.	Off	If it continues, perform some cleaning cycles (read section "Initial Start-up with a new cylinder, Page 16").
E8	Cylinder lifetime expired (3000 hours).	Unit disabled. Reset the hour counter (read section "Resetting the hour counter").	On	Change the cylinder.
E9	High controller temperature (above 176 °F / 80 °C).	The warning is automatically reset if the temperature decreases below 176 °F / 80 °C.	Off	Check the ambient temperature near the controller, replace the controller if the temperature is OK.

Troubleshooting		
Problem	Causes	Solutions
The humidifier does not turn on	<ol style="list-style-type: none"> <li>1. No electrical power.</li> <li>2. On/off switch of the humidifier in position "O" (OFF).</li> <li>3. Control connectors improperly connected.</li> <li>4. Power source failure; blown fuse; tripped breaker.</li> <li>5. Transformer failure.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the safety devices upstream from the humidifier and the presence of power.</li> <li>2. Close the switch on the panel: position "I" (ON).</li> <li>3. Check that connectors are properly inserted in terminal block.</li> <li>4. Check the power source; check condition of fuses; check for tripped breaker.</li> <li>5. Check for proper voltage across 24VAC and GND on control. If no voltage present, replace controller.</li> </ol>
The humidifier does not start operation	<ol style="list-style-type: none"> <li>1. Remote ON/OFF contact open.</li> <li>2. The humidistat has not been connected correctly.</li> <li>3. Humidistat failure.</li> <li>4. Control signal not compatible with the type set.</li> <li>5. Value measured by the humidistat sensor(s) higher than the corresponding RH set point.</li> <li>6. Low conductivity water.</li> </ol>	<ol style="list-style-type: none"> <li>1. Close ON/OFF contacts.</li> <li>2. Check the external connection.</li> <li>3. Replace the humidistat.</li> <li>4. Confirm for correct signal type for connected humidistat using <i>Selecting the signal type</i> procedure on Page 17.</li> <li>5. Using RH meter, confirm accuracy of RH sensor(s).</li> <li>6. If 230 VAC humidifier, consider installing the Low Conductivity cylinder (Y3484) listed on Page 23.</li> </ol>
The humidifier fills with water without producing steam	<ol style="list-style-type: none"> <li>1. High steam back pressure.</li> <li>2. Fill valve strainer clogged.</li> <li>3. Mineral buildup in the fill cup.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check that the steam hose is not kinked or sagging, trapping condensate.</li> <li>2. Clean the fill valve strainer.</li> <li>3. Clean the fill cup.</li> </ol>
The humidifier wets the duct	<ol style="list-style-type: none"> <li>1. The steam nozzle is not installed correctly (too near the top of the duct or the condensate return is blocked).</li> <li>2. Air flow rate is too low.</li> <li>3. Humidifier active when the fan in the duct is off.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check that the steam nozzle is installed correctly.</li> <li>2. Increase air flow in duct or decrease maximum steam production setting (see Page 17).</li> <li>3. Check the connection of the device (flow switch or differential pressure switch) controlling the humidifier to the ventilation in the duct.</li> </ol>
The humidifier wets the floor below	<ol style="list-style-type: none"> <li>1. The humidifier drain is blocked.</li> <li>2. The supply water or overflow circuit has leaks.</li> <li>3. The condensate drain pipe does not bring the water back to the drain pan.</li> <li>4. The steam hose is not properly fastened to the cylinder.</li> </ol>	<ol style="list-style-type: none"> <li>1. Clean the drain assembly and pan.</li> <li>2. Check the entire water circuit.</li> <li>3. Check the correct position of the condensate drain hose in the drain pan.</li> <li>4. Check the fastening of the hose clamps on the steam outlet.</li> </ol>
Water in the cylinder turns black	<ol style="list-style-type: none"> <li>1. Minerals in the cylinder have over concentrated and are deteriorating the electrodes.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check for sags &amp; kinks that could trap condensate in the steam hoses that could cause a back pressure on the cylinder.</li> <li>2. Check the duct static pressure.</li> <li>3. Check the fill valve and inlet strainer.</li> <li>4. Check the drain pump operation.</li> <li>5. Correct installation problems and replace cylinder.</li> </ol>
Heavy arcing occurs within hours of startup	<ol style="list-style-type: none"> <li>1. The feed water contains large amounts of Iron, Copper or other conductive contaminants.</li> </ol>	<ol style="list-style-type: none"> <li>1. If you are using a softener, discontinue use.</li> <li>2. Check the electrodes in the cylinder to be sure they were not damaged in shipping. Use a ohm-meter to check whether they are short-circuited. Look through the steam outlet to see whether the electrodes are loose.</li> </ol>
Humidifier continuously fills and drains without producing steam	<ol style="list-style-type: none"> <li>1. Mineral has bridged between the electrodes.</li> <li>2. There is back pressure from the steam hoses or duct.</li> <li>3. The flow regulator in the fill valve is broken or out of place.</li> <li>4. Water conductivity is very high.</li> <li>5. Water is foaming excessively.</li> </ol>	<ol style="list-style-type: none"> <li>1. Perform cleaning cycles or replace the cylinder.</li> <li>2. Check the steam hoses for kinks or gullies that might be trapping condensate.</li> <li>3. Replace the fill valve (stuck open).</li> <li>4. Consider using a mix of demineralized water with raw water.</li> <li>5. Check cylinder - replace if exhausted.</li> </ol>

### **WARNING**

Electrical shock hazard!

Always disconnect the main power before performing maintenance on the humidifier!

The humidifier and its cylinder contain live electrical components and hot surfaces, and therefore all service and/or maintenance operations must be performed by expert and qualified personnel, who are aware of the necessary precautions. Remove the cylinder from the humidifier only after having drained it completely using the manual "drain" button or procedure. Check that the model and the power supply voltage of the new cylinder correspond to the data on the rating label.

### **NOTICE**

It is recommended that during the off-season or long inactivity, the unit is drained of water, the water supply turned off and the unit is powered down.

#### Recommended Periodic Checks

- After one hour of operation: Check that there are no water leaks.
- Every fifteen days or no more than 300 operating hours: Check operation, that there are no water leaks and the general condition of the cylinder. Check that during operation there is no arcing between the electrodes.
- Every three months or no more than 1000 operating hours: Check operation, that there are no water leaks and, if necessary, replace the cylinder. Check that there are no blackened parts of the cylinder. If there are blackened parts of the cylinder, check the condition of the electrodes, and if necessary replace the cylinder.
- Annually or no more than 2500 operating hours: Replace the cylinder.

#### Maintenance of Plumbing Components

### **WARNING**

When cleaning the plastic components do not use detergents or solvents.

**Cleaning the fill valve**—Disconnect the cables and the hoses. Remove the valve and check the condition of the inlet filter. Clean, if necessary, with a soft brush and warm water.

**Cleaning the drain pump**—Remove the valve body. Clean, if necessary, with a soft brush and warm water.

**Cleaning the drain pan**—Clean the drain pan of any mineral deposits and check that the water flows freely from the pan to the drain at the drain pump.

**Cleaning the supply, fill, and overflow pipes**—Check that the piping is clear of obstructions; clean or replace if necessary.

After replacing or checking the plumbing, check that all components have been reconnected correctly using the proper seals. Re-start the humidifier and perform 2 or 3 cleaning cycles (see section "Starting with a new cylinder"), then check for any water leaks.

### **WARNING**

Always disconnect the main power before touching the cylinder in the event of leaks, as current may flow through the water.

#### Cylinder Maintenance

The life of the cylinder depends on a number of factors, including the amount and type of mineral in the water, the correct use and sizing of the humidifier, and the output, as well as careful and regular maintenance. Another factor affecting cylinder life is Maximum Production—the higher the production rate, the shorter the cylinder life; for this reason, the HCSteam-35 humidifiers is preset from the factory at 70%. Further reductions in maximum production will extend cylinder life.

#### Replacing the Cylinder

### **WARNING**

Scalding hazard!

The cylinder may be hot. Allow it to cool before touching it or wear protective gloves.

To replace the cylinder:

1. Completely drain the cylinder by pressing and holding the "**drain**" button for 15 seconds until the cylinder is empty.
2. Turn the humidifier off and disconnect the main power.
3. Remove the cover.
4. Loosen the hose clamp and slip the steam hose from the steam hose adapter.
5. Loosen two screws that hold the steam hose adapter onto the back wall of the humidifier; then slide the adapter up from the cylinder and remove; flip up the cylinder holding bracket and lift up on the cylinder.
6. Disconnect the electrical connections from the top of the cylinder.
7. Carefully remove cylinder from the pump manifold. Make sure the O-ring remains in the manifold (see figure 27).
8. Verify cylinder model/voltage first. Then install the new cylinder in the humidifier by performing the previous operations in reverse.
9. Perform initial start-up with new cylinder as provided on page 17.

## **! NOTICE**

Do not tighten the hose clamp so tight that it crushes the cylinder adapter outlet.

Electrical connections to the cylinder must be tight or possible fire hazard may result. Threaded nuts on power wires must be torqued to 44 in-lb  $\pm 10\%$  (5 Nm  $\pm 10\%$ ).

## **WARNING: RISK OF BURNING/FIRE HAZARD**

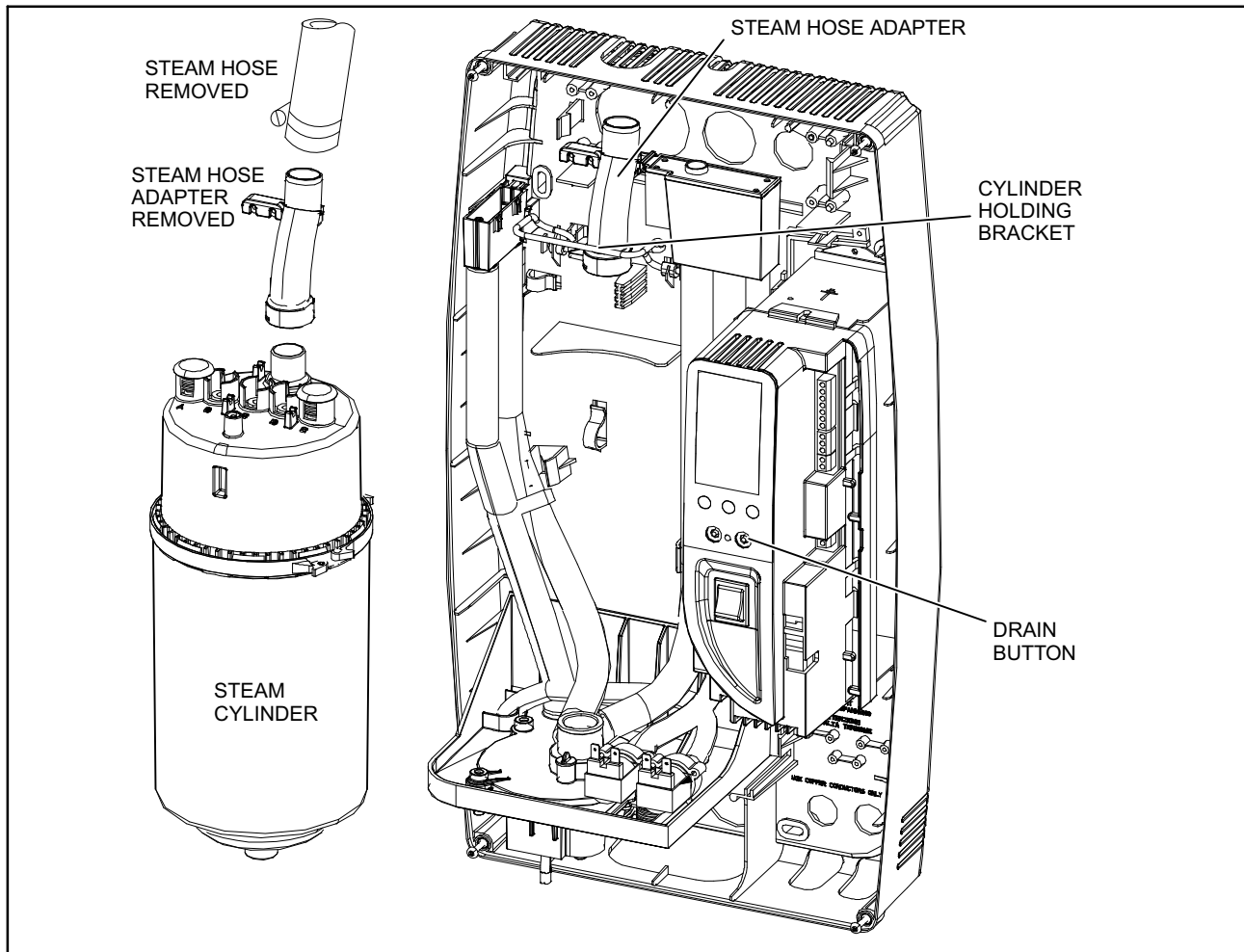
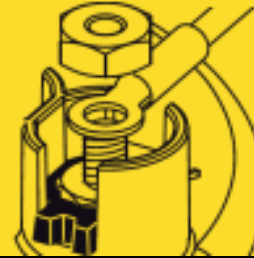
Firmly tighten the nut

**(44 in-lbs  $\pm 10\%$  / 5 Nm  $\pm 10\%$ )**

See diagram below for proper installation.

**WARNING!**

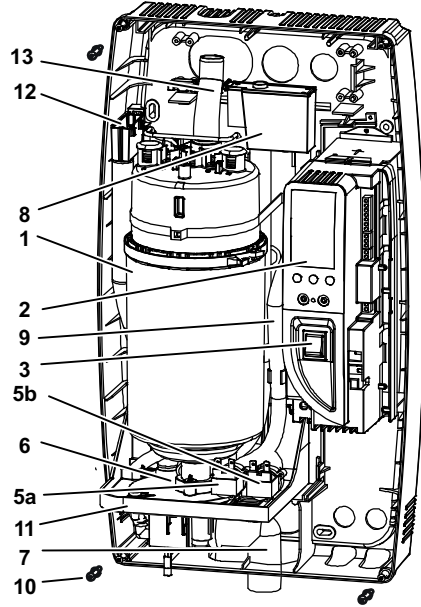
**DO NOT OVERTIGHTEN TERMINAL NUTS**



**Figure 26. Figure 27. Replacing the Cylinder**

**Table 5. Replacement Parts**

Item	Part No.	Description
<b>1</b>		STEAM CYLINDER
	Y3481	CYLINDER STD. CONDUCTIVITY 110-120/1 5.5 LBS/HR MODELS
	Y3482	CYLINDER STD. CONDUCTIVITY 220-240/1 12 LBS/HR MODELS
	Y3484	CYLINDER LOW CONDUCTIVITY 220-240/1 12 LBS/HR MODELS
<b>2</b>	Y3773	CONTROL MODULE 5.4 kg/h 220-240 VAC
	Y3774	CONTROL MODULE 2.5 kg/h 110-120 VAC
<b>3</b>	—	ON/OFF SWITCH (special order)
<b>5a,b</b>	Y3775	FILL (5a) & DRAIN TEMPERING VALVE (5b) 110-120 VAC
	Y3776	FILL (5a) & DRAIN TEMPERING VALVE (5b) 220-240 VAC
<b>6</b>	Y3777	DRAIN PUMP 110-120 VAC
	Y3778	DRAIN PUMP 220-240 VAC
<b>7</b>	Y3779	90 DEGREE DRAIN ELBOW
<b>8</b>		FILL CUP + PLUG
<b>9</b>		FILL CUP HOSE
		DRAIN HOSE
<b>10</b>	Y3780	COVER HOLDING SCREWS (4 USED)
<b>11</b>		DRAIN PAN
<b>12</b>		DRAIN TANK + PLUG
<b>13</b>	Y3801	STEAM CYLINDER HOSE ADAPTER



**Other replacement parts and accessories:**

- Steam Hose (10' Y3782)
- Steam Condensate hose 10' (Y3783)
- Fill Hose (Y5880)
- Air proving switch (Y3786)
- HC Digital Automatic Humidistat (Y3760)
- ComfortSense® 7000 thermostat (Y2081)
- icomfort Wi-Fi® thermostat
- Steam Nozzle (Y3781)

**Table 6. Technical Specifications**

Steam flows, VAC, kW	5.5 lbs/hr (2.5 kg/h): 110 VAC 1-phase 50-60 Hz, 1.86 kW 12 lbs/hr (5.4 kg/h): 230 VAC 1-phase 50-60 Hz, 4.05 kW	Notes
Steam pressure	3.81 in w.c. / 950 Pa	For duct only.
Dimensions (mm )	24" x 14" x 8" (600 x 341 x 204 mm)	(Height x Width x Depth)
Weight empty / packaged / installed with water	18 / 22 / 26 lbs. (8 / 10 / 12 kg)	
Electrode power cables	12 AWG	
Power relays	2 x 30 Amp	On board.
Ground connection	Screw	
Input water type	Potable water	No demineralized or softened water.
Conductivity range	125-1250 µS/cm	Special cylinder for low conductivity <350 (for 230 volt model only).
Water fill connection	3/4" female water hose connection	Adapter to 3/4" FPS..
Water fill - instant flow	0.09 – 0.16 gpm (0.35 – 0.60 l/min)	
Drain connection	1.25" O.D. (32 mm)	Adjustable from horizontal to downward. May be from back or bottom of unit.
Drain water temp	< 140°F (< 60°C)	Drain tempering device.
Drain flow	Max 7.1 gpm (max 26.8 l/min)	
Ambient indoor operating and storage temperatures and humidity (outdoor installation not valid)	Operating temperature: 34°F to 104°F (1°C to 40°C) Operating relative humidity: 10 to 60% RH Storage temperature: 14°F to 158°F (-10°C to 70°C) Storage relative humidity: 5 to 95% rH	Storage conditions only apply to HC- Steam units prior to installation.



